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Saka et al.

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(54) **RECORDING APPARATUS**

(71) Applicant: **SEIKO EPSON CORPORATION**, Tokyo (JP)

(72) Inventors: **Yoshihisa Saka**, Shiojiri (JP); **Yuji Miyamoto**, Shiojiri (JP)

(73) Assignee: **Seiko Epson Corporation**, Tokyo (JP)

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B41J 2/15 (2006.01)
B41J 2/175 (2006.01)

(52) **U.S. Cl.**
CPC ***B41J 2/175*** (2013.01)

(58) **Field of Classification Search**
CPC B41J 2/175; B41J 2/17509; B41J 2/18; B41J 2/17513; B41J 2/17523; B41J 2/17503
See application file for complete search history.

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Primary Examiner — Lamson Nguyen
(74) *Attorney, Agent, or Firm* — Workman Nydegger

(57) **ABSTRACT**

There is provided a printer including: a recording head which performs recording by ejecting ink; a recording unit which stores the recording head; a liquid storage unit which is provided outside the recording unit, and stores a liquid storage body that stores the ink to be ejected from the recording head; ink supply tubes which supply the ink that is stored in the liquid storage body stored in the liquid storage unit to the recording head; and a supporting portion which is provided in the liquid storage unit, and supports the ink supply tubes. As a mark which is a reference of a part supported by the supporting portion, a line is provided in the ink supply tubes.

19 Claims, 13 Drawing Sheets

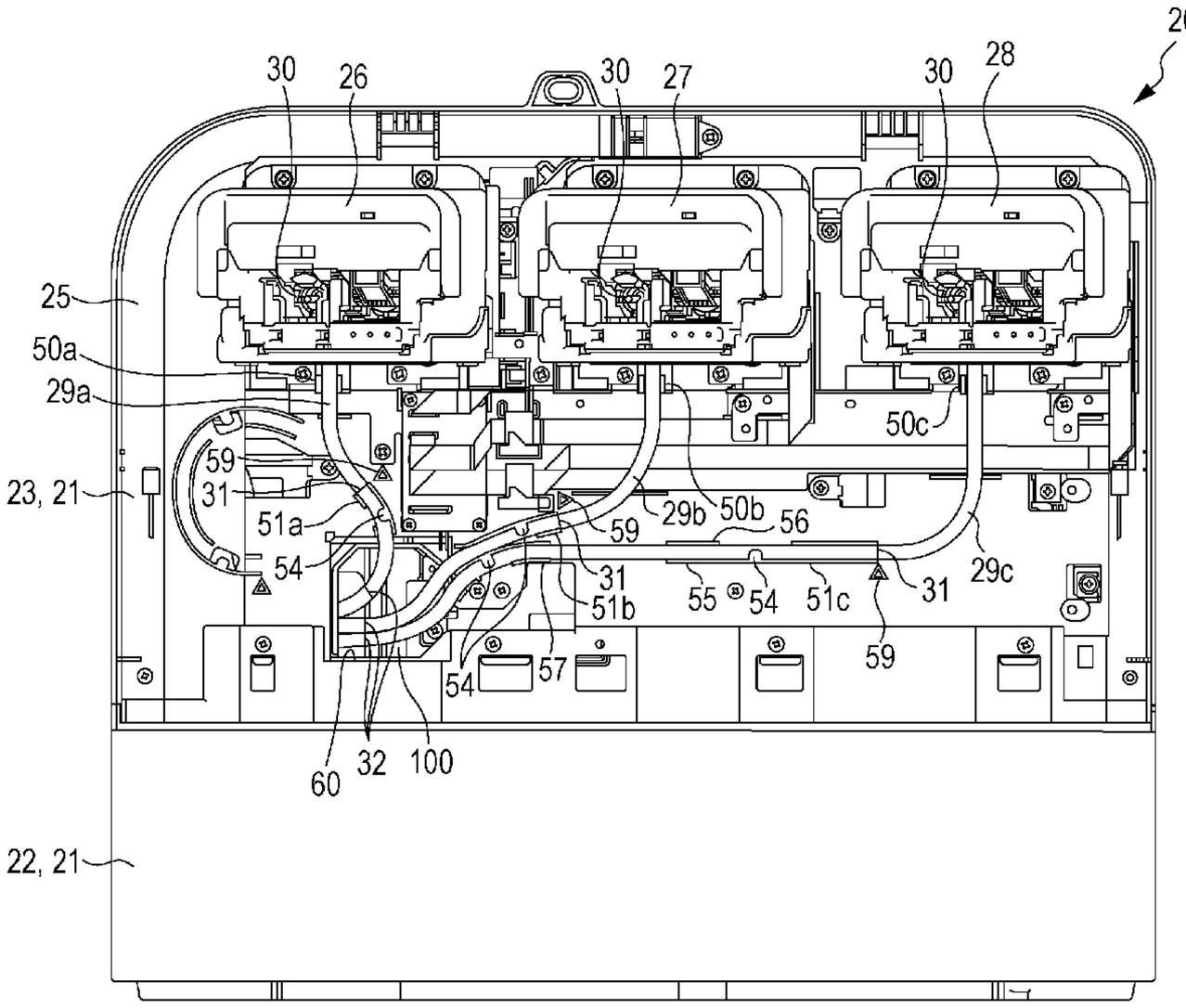
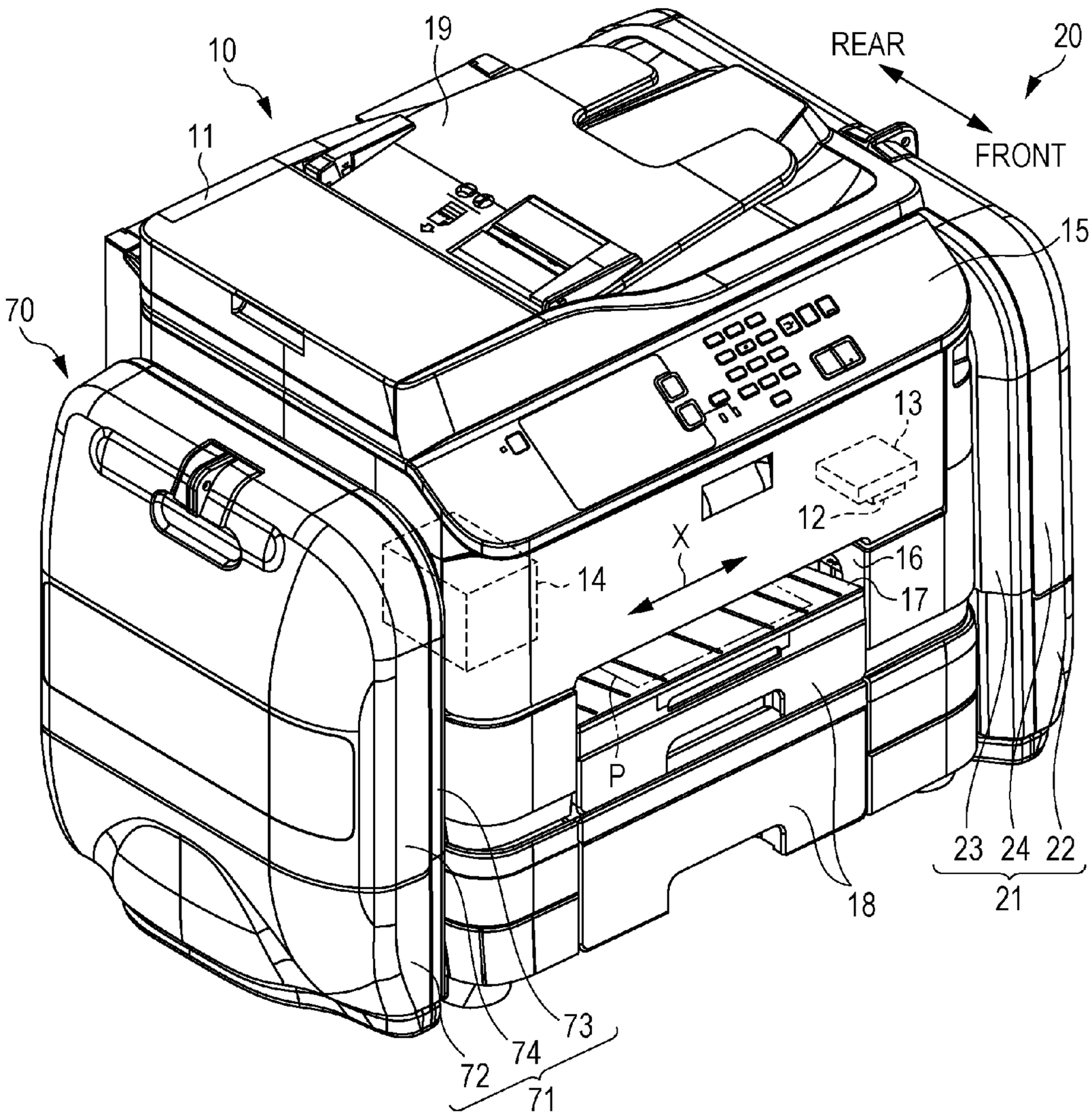


FIG. 1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FRONT
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FIG. 2

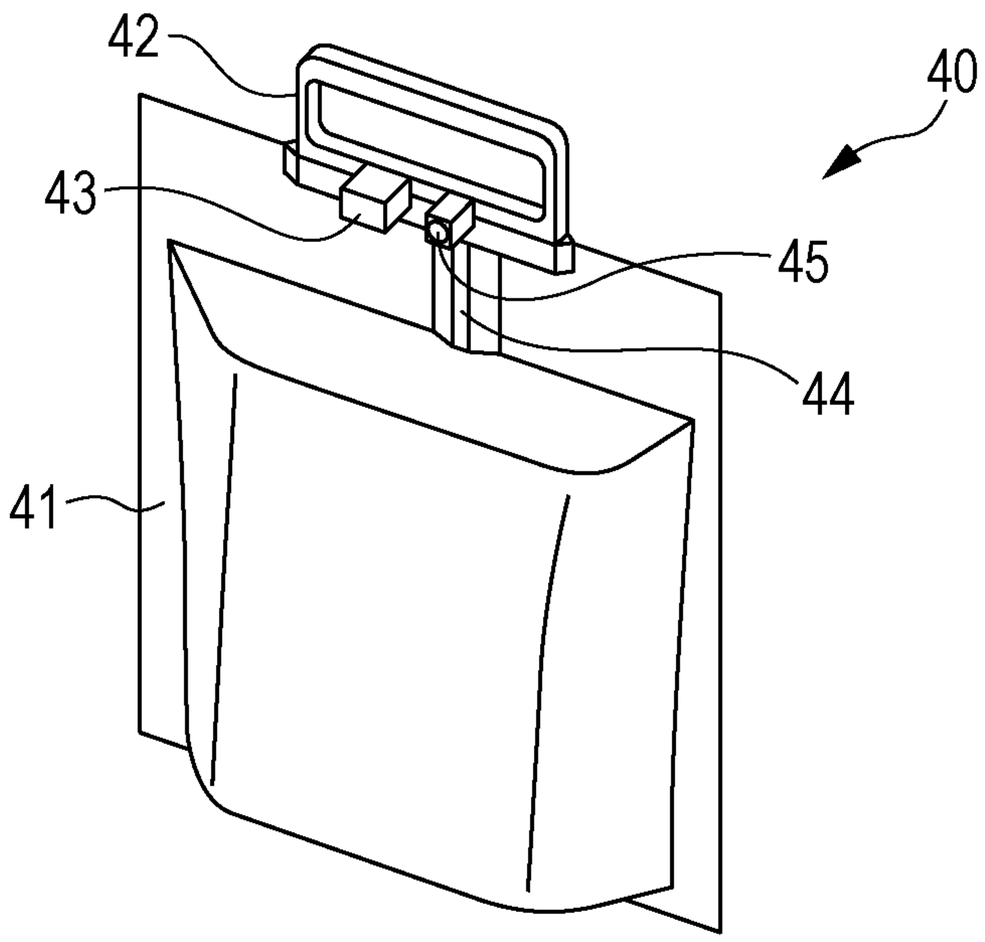

FIG. 3

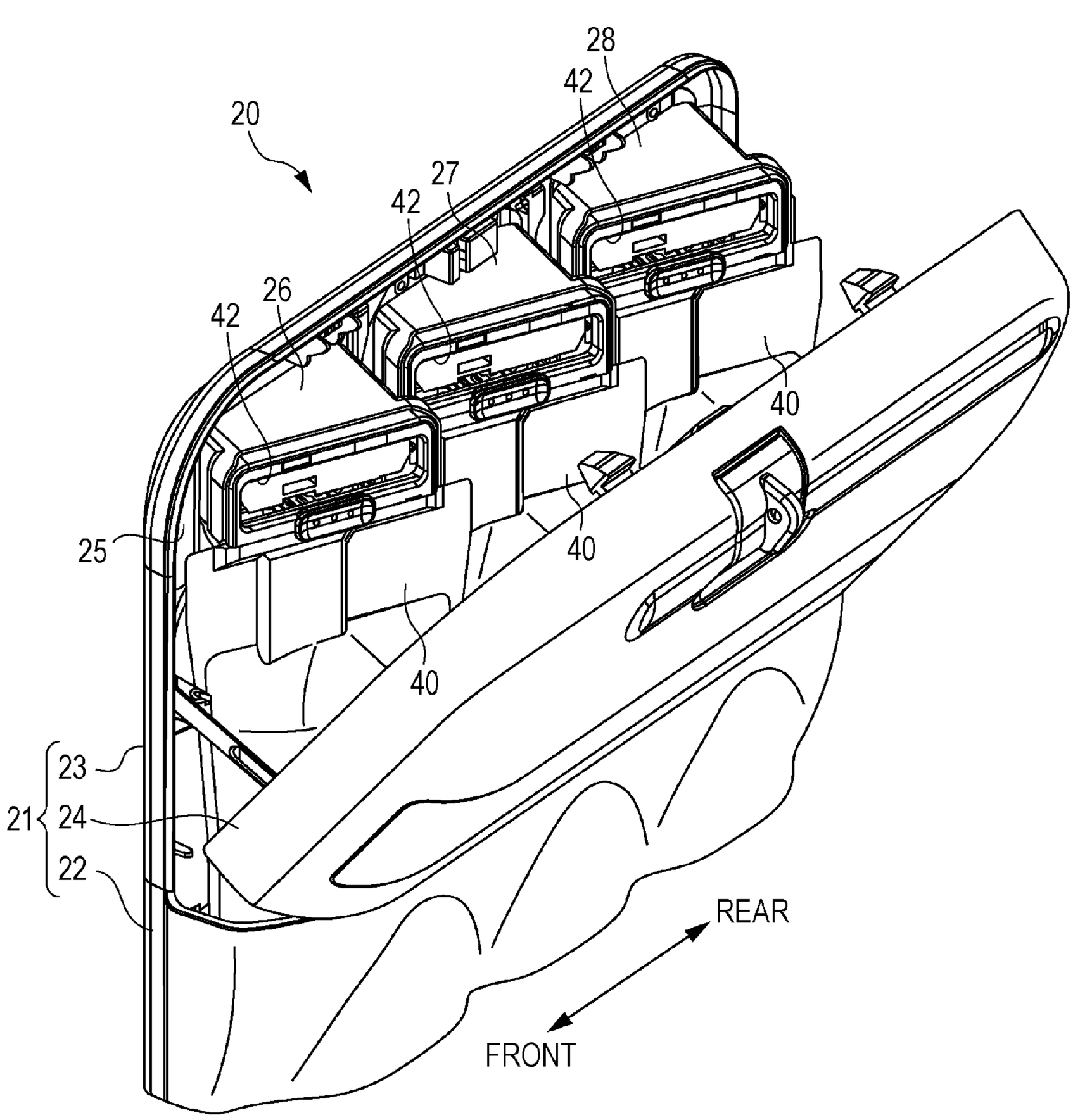

FIG. 4

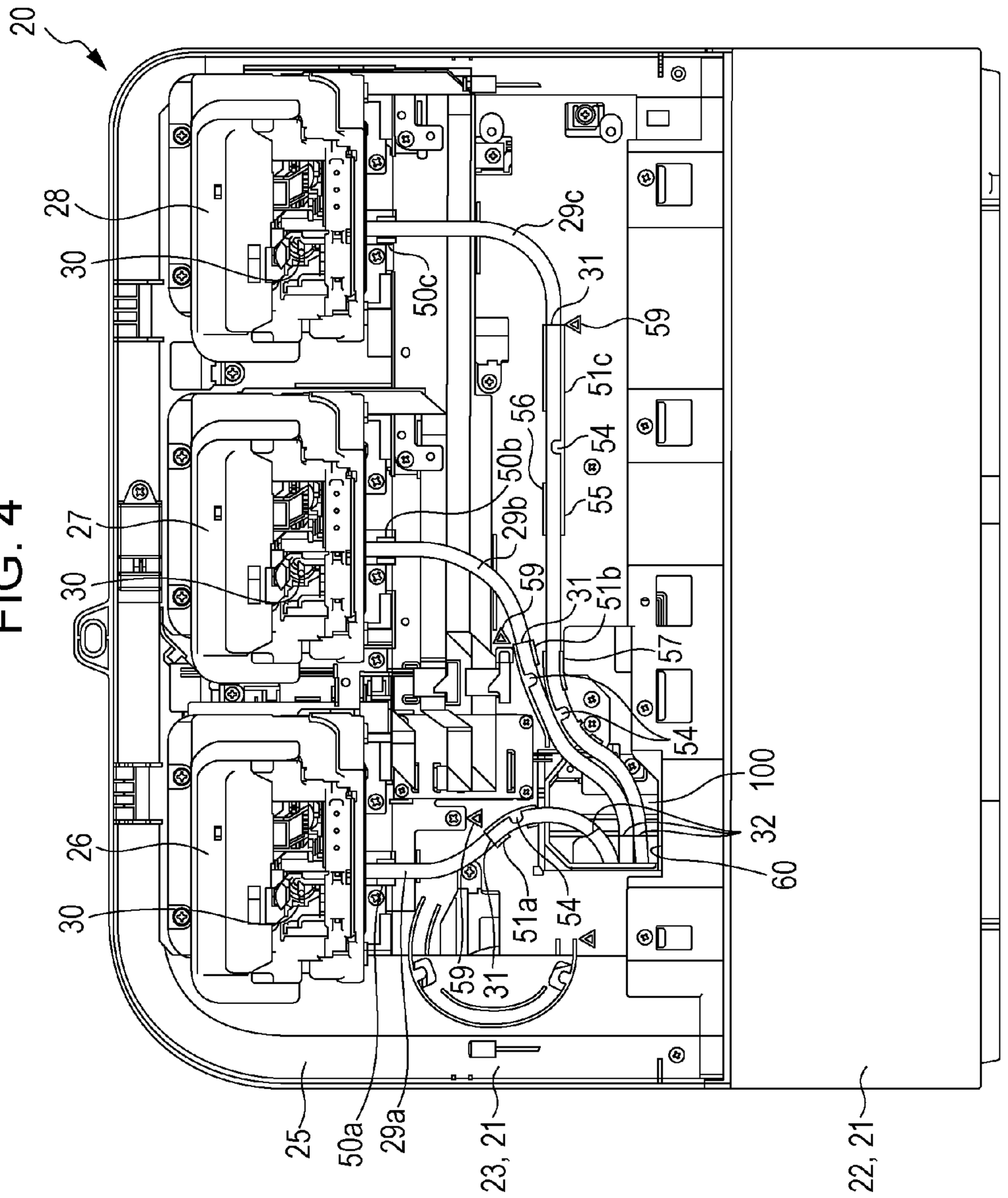
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FIG. 5

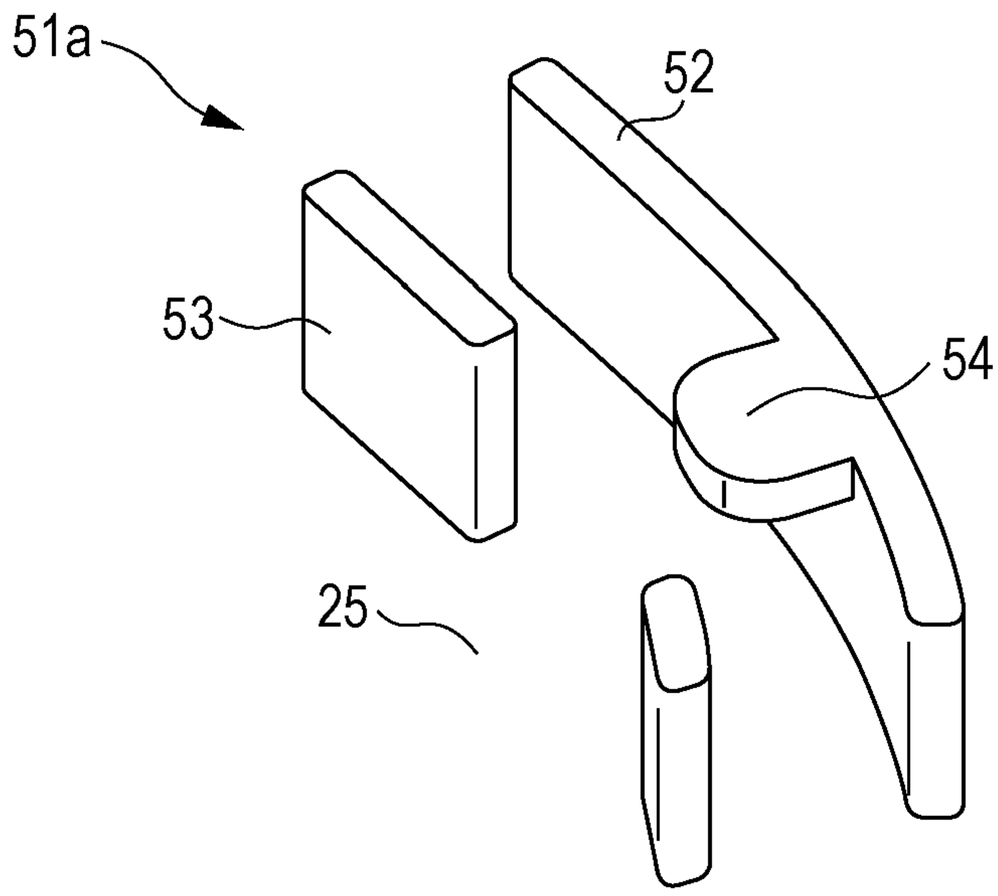


FIG. 6

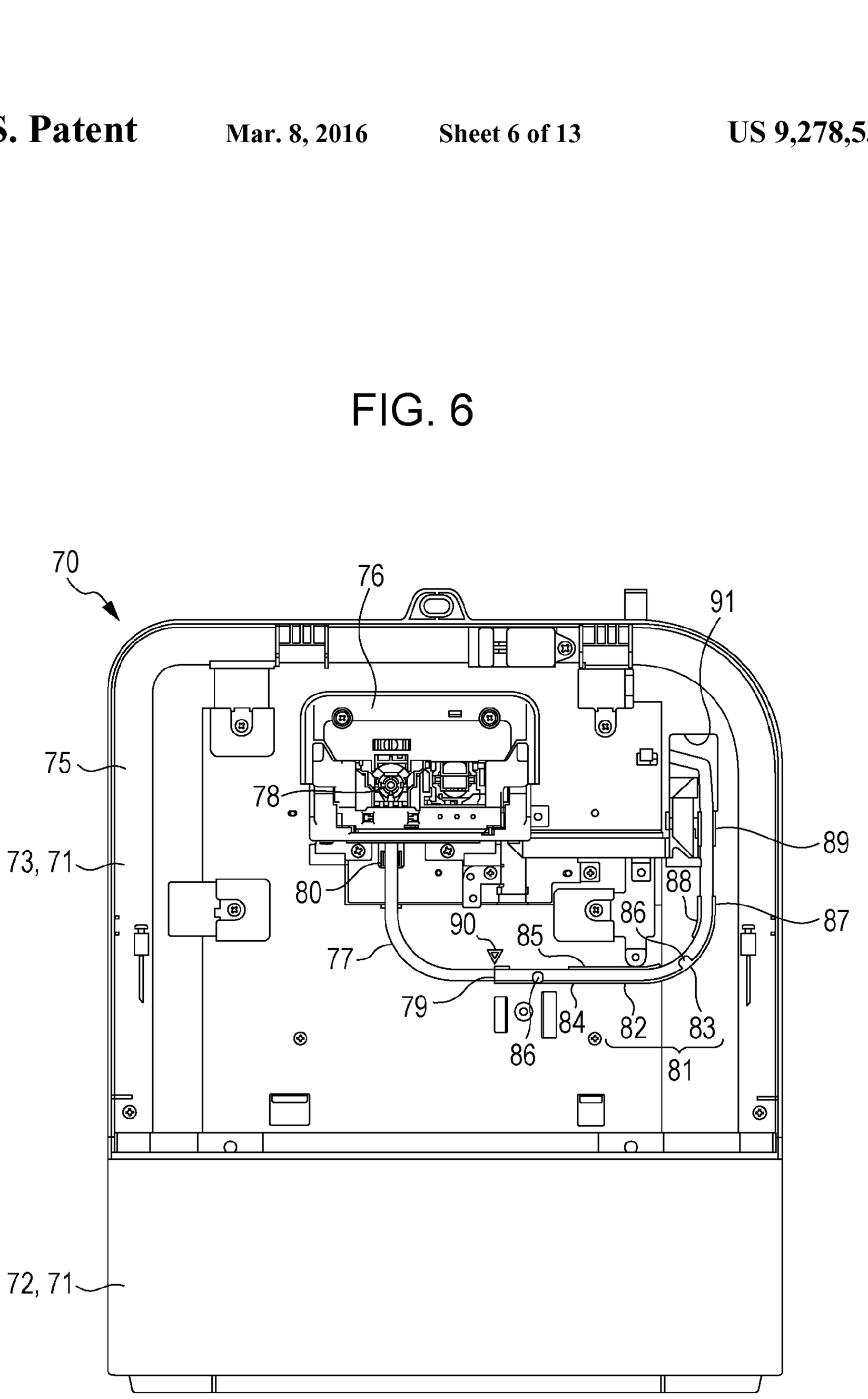


FIG. 7

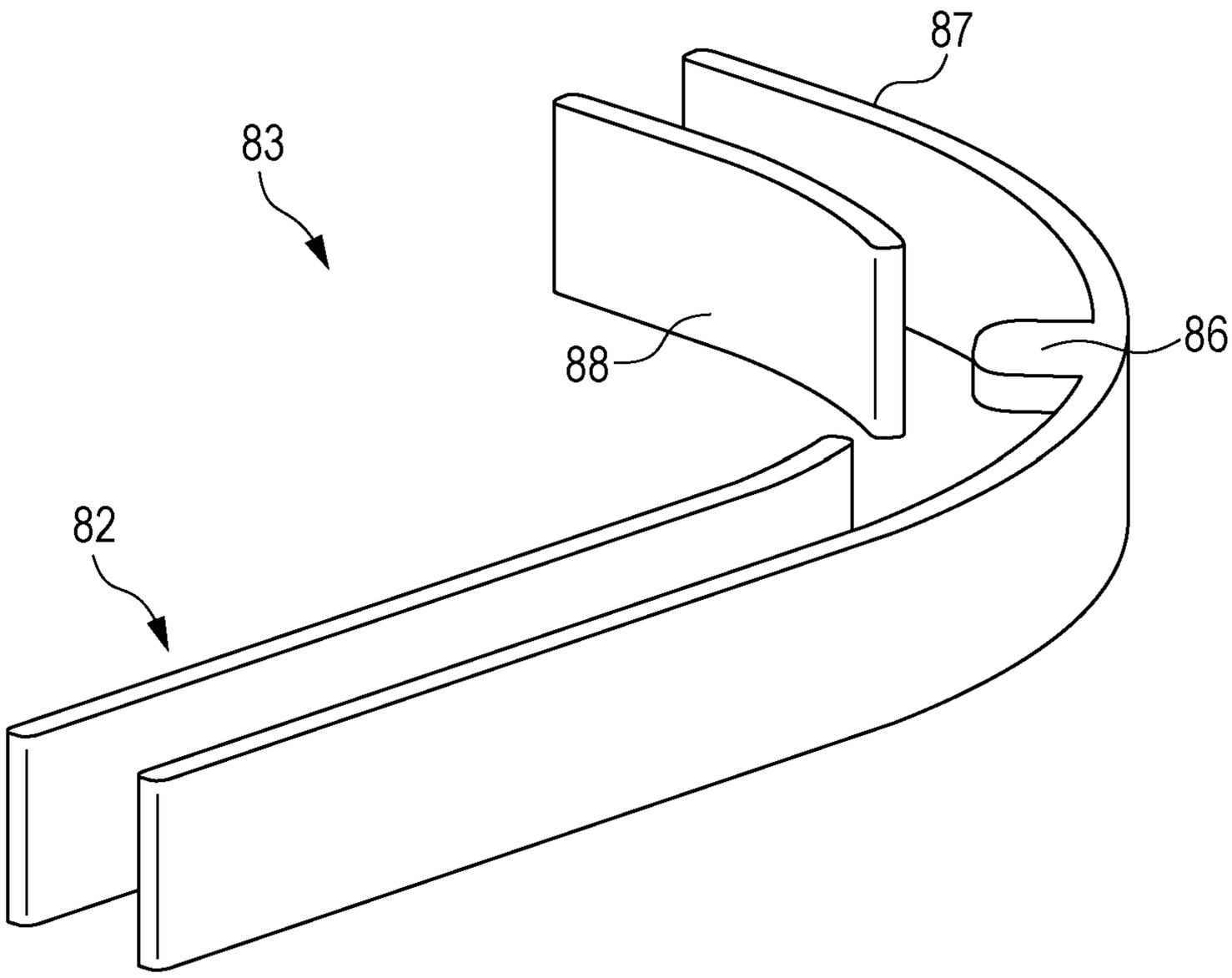


FIG. 8

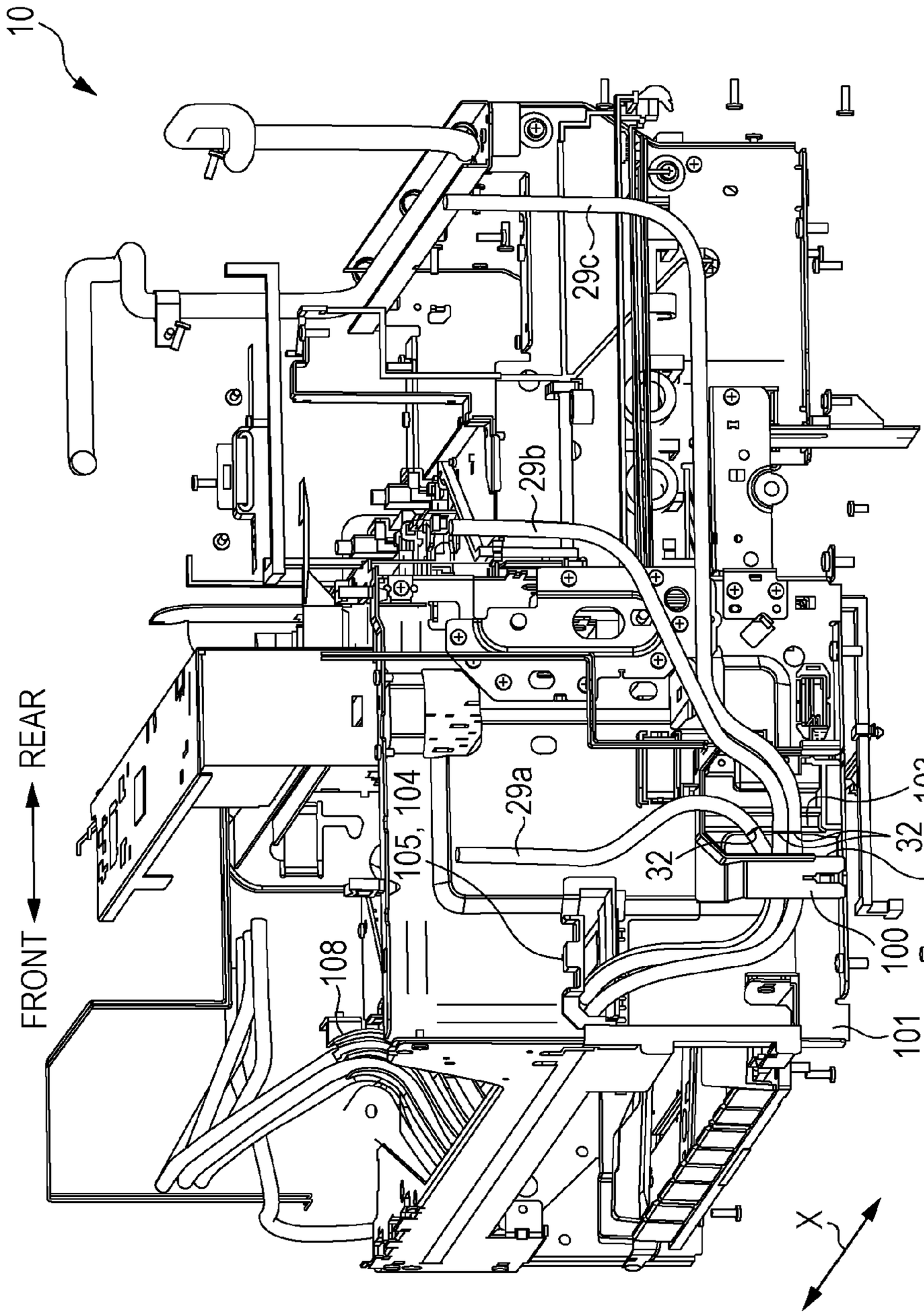


FIG. 9

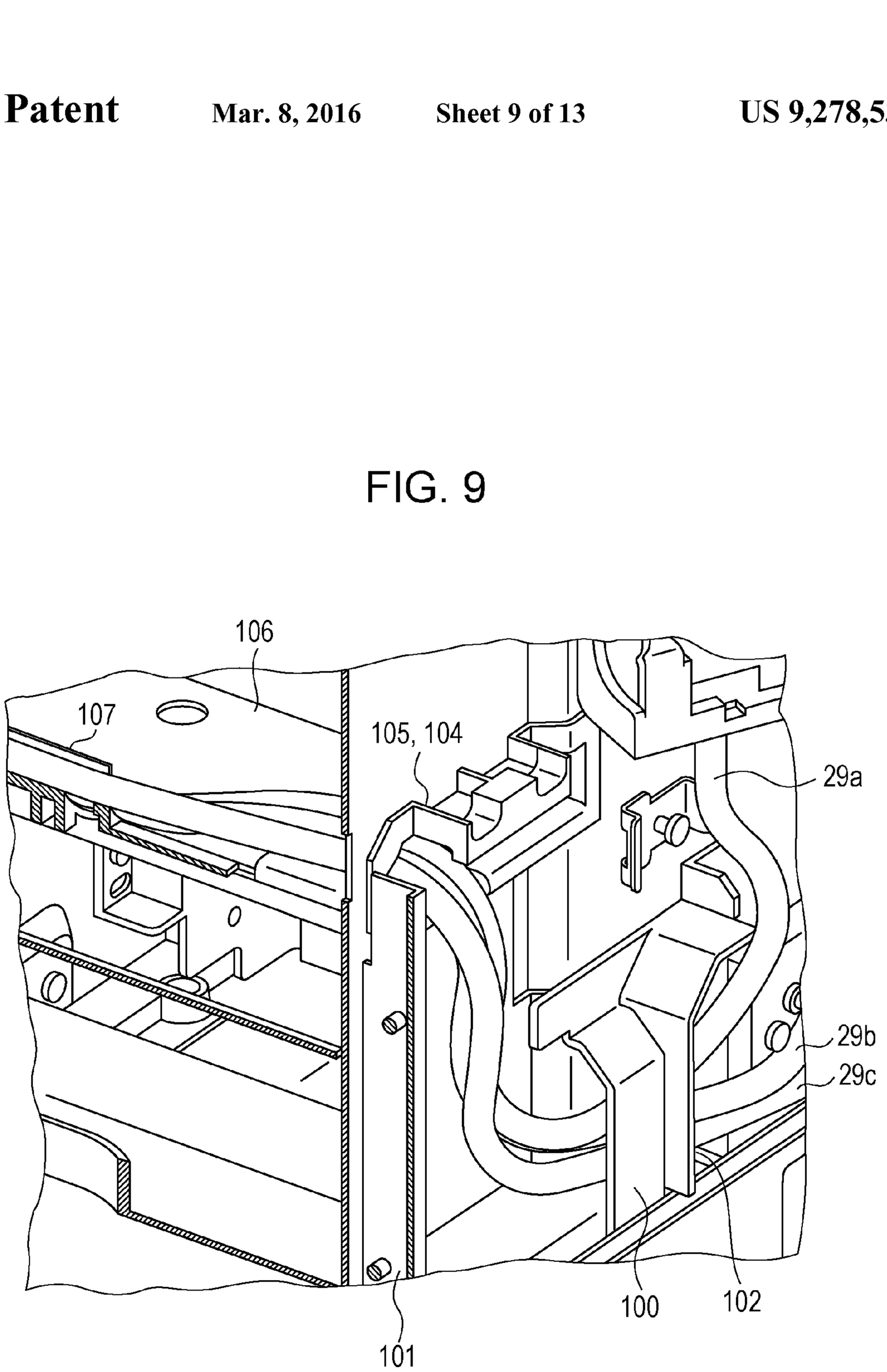


FIG. 10

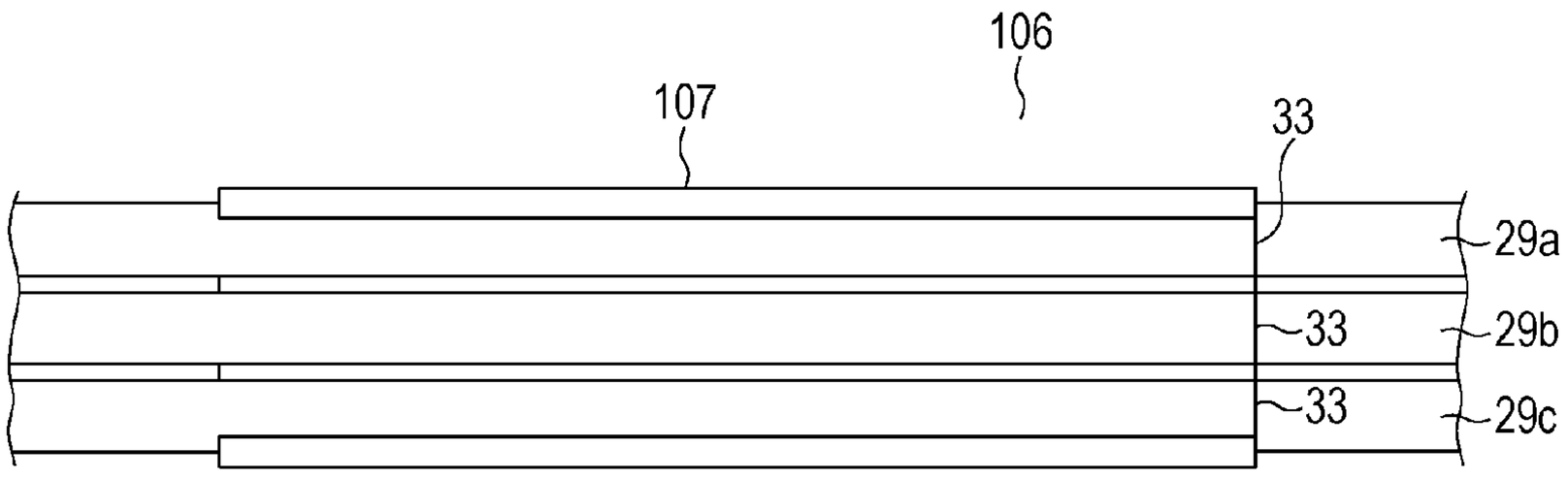


FIG. 11

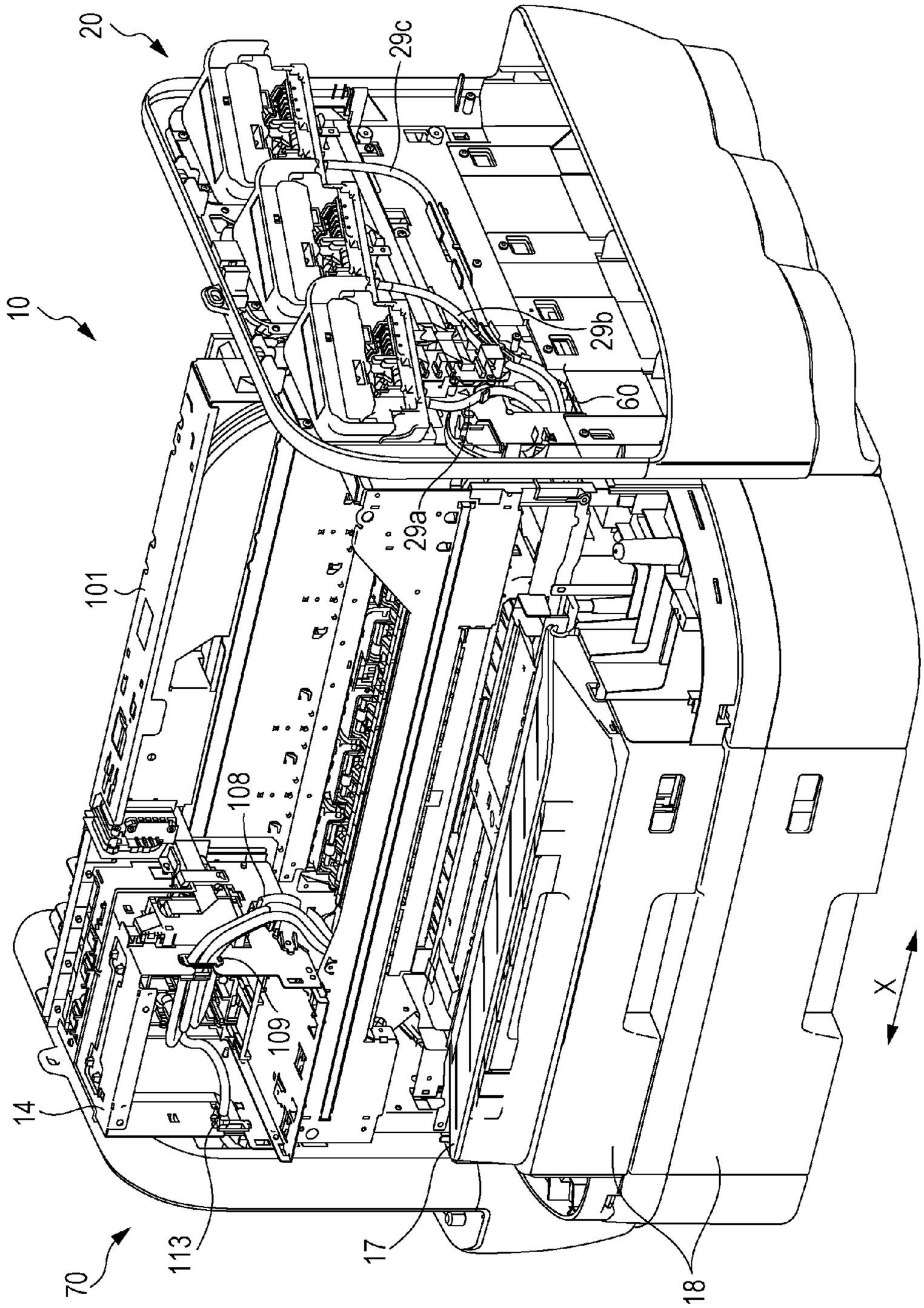


FIG. 12

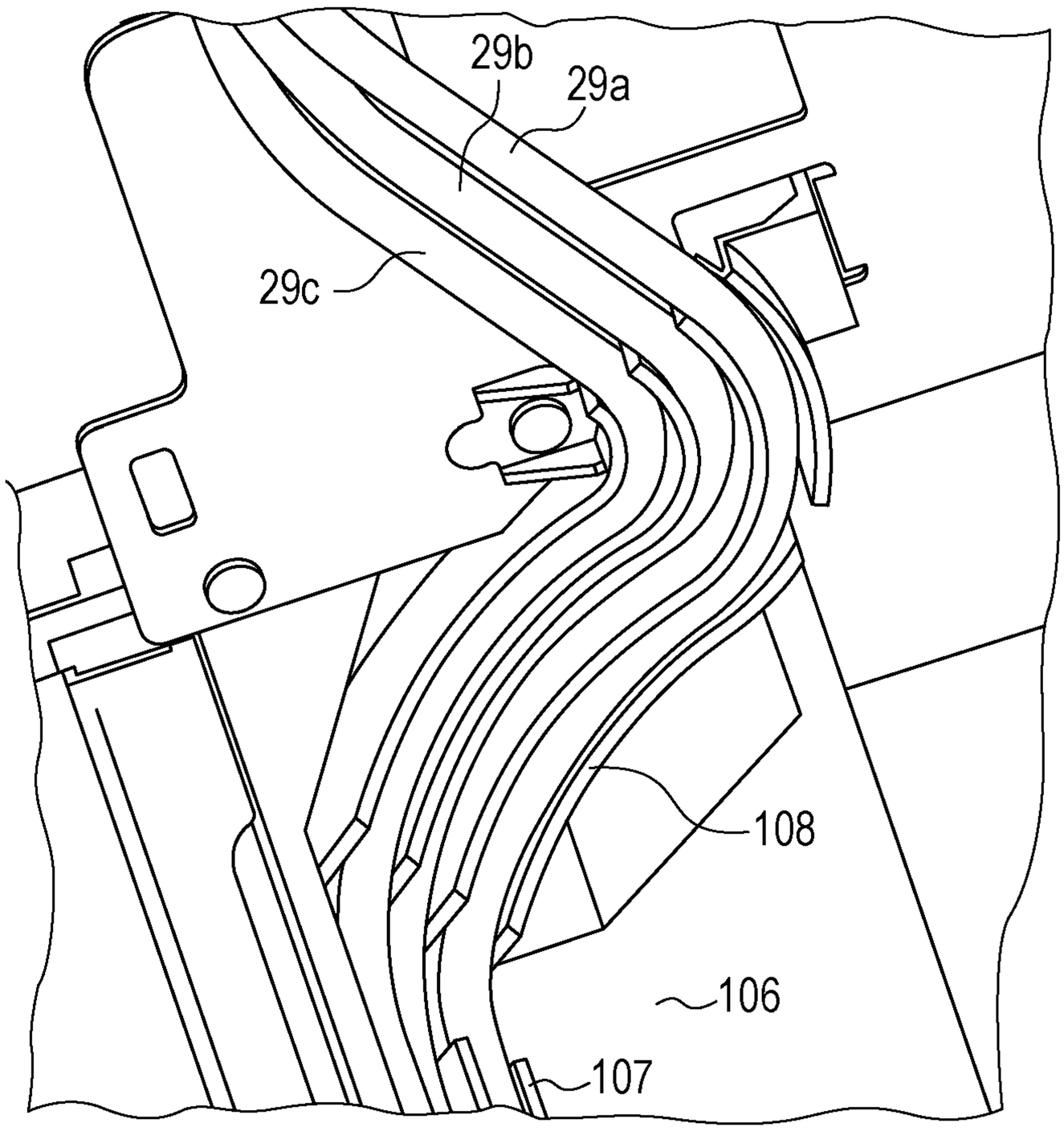
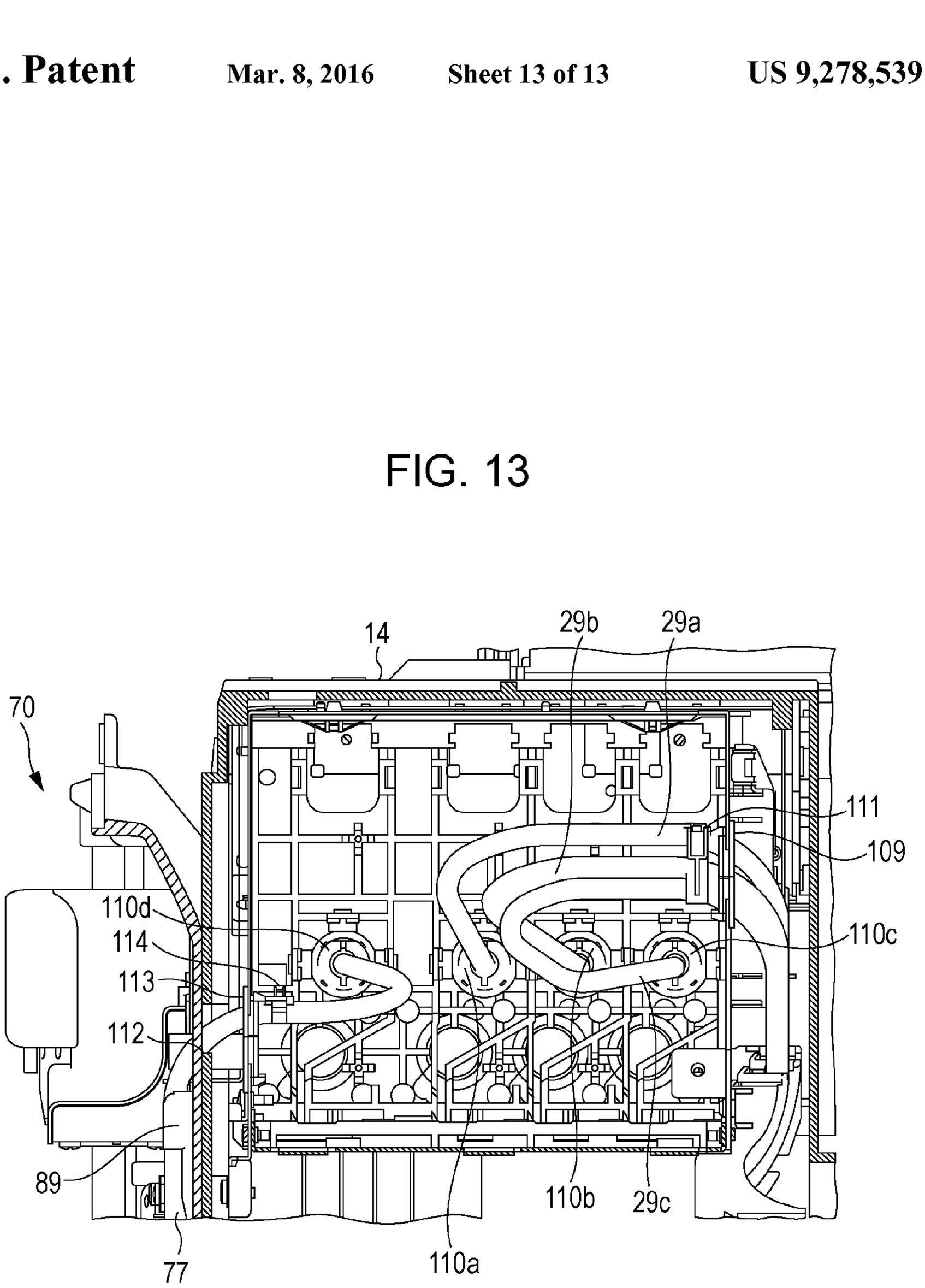


FIG. 13



RECORDING APPARATUS

BACKGROUND

1. Technical Field

The present invention relates to a recording apparatus, such as an ink jet type printer.

2. Related Art

In the related art, an ink jet type printer which performs printing (recording) by ejecting ink (liquid) onto a recording medium, such as a paper sheet, from a liquid ejecting head (recording head) is known as one type of a recording apparatus. In such a printer, in order to make it possible to supply the ink to the liquid ejecting head continuously and stably even when a relatively large amount of printing is performed, a configuration in which an ink bag (liquid storage body) which has a relatively large amount of storage of the ink is provided is suggested (for example, refer to JP-A-2009-202346).

In the recording apparatus described in JP-A-2009-202346, the ink bag is supported by a supporting device which is provided outside a housing, and the ink is supplied through an ink supply tube to the liquid ejecting head which is provided inside the housing from the ink bag.

However, as described above, in the recording apparatus in which the ink is supplied to the liquid ejecting head provided inside the housing from the ink bag provided outside the housing, the ink is supplied to the recording head from the ink bag through the ink supply tube. For this reason, when the ink supply tube which links the ink bag and the liquid ejecting head to each other is bent and crushed in the middle, there is a concern that a printing error, such as dot omission, is generated because a flow of the ink deteriorates, and a sufficient amount of ink cannot be supplied to the recording head.

In addition, such a problem is not limited to the recording apparatus which ejects the ink from the liquid ejecting head, but generally common to the recording apparatus which supplies the liquid via the liquid supply tube to the recording head from the liquid storage body that stores the liquid to be ejected from the recording head.

SUMMARY

An advantage of some aspects of the invention is to provide a recording apparatus which can suppress that the liquid supply tube that links the liquid storage body and the recording head to each other is bent and crushed.

According to a first aspect of the invention, there is provided a recording apparatus including: a recording head which performs recording by ejecting liquid onto a recording medium; a recording unit which stores the recording head; a storage unit which is provided outside the recording unit, and stores a liquid storage body that stores the liquid to be ejected from the recording head; a liquid supply tube which supplies the liquid that is stored in the liquid storage body stored in the storage unit to the recording head; and a supporting portion which is provided in at least one of the recording unit and the storage unit, and supports the liquid supply tube. A mark which is a reference of a part supported by the supporting portion is provided in the liquid supply tube.

According to a second aspect of the invention, there is provided a recording apparatus including: a recording head which performs recording by ejecting liquid onto a recording medium; a recording unit which stores the recording head; a storage unit which stores a liquid storage body that stores the liquid to be ejected from the recording head; a liquid supply tube which supplies the liquid that is stored in the liquid storage body stored in the storage unit to the recording head;

and a supporting portion which is provided in at least one of the recording unit and the storage unit, and supports the liquid supply tube. A mark which is a reference of a part supported by the supporting portion is provided in the liquid supply tube.

According to the above-described configuration, since the liquid supply tube is supported by the supporting portion, it is possible to suppress that the liquid supply tube is bent and crushed.

However, only by providing the supporting portion, there is a concern that the liquid supply tubes are arranged in a state of being bent and crushed from the beginning, and supported by the supporting portion as in such a bent and crushed state.

Meanwhile, in the above-described configuration, the mark which is a reference of the part supported by the supporting portion is provided in the liquid supply tube. For this reason, by matching the position where the liquid supply tube is supported by the supporting portion with the mark which is a reference, it is possible to support the liquid supply tube at an appropriate part not making the liquid supply tube bent and crushed. Therefore, according to the above-described configuration, it is possible to suppress that the liquid supply tubes are arranged in a state of being bent and crushed from the beginning.

In short, according to the above-described configuration, it is possible to suppress that the liquid supply tube is bent and crushed, by appropriately supporting the liquid supply tube. Furthermore, it is possible to suppress that a flow of the liquid in the liquid supply tube deteriorates and a printing error or the like is generated.

In the recording apparatus described above, it is preferable that the supporting portion includes a guide groove which stores the liquid supply tube. It is preferable that, in the guide groove, an outer circumferential wall on the outside of a curved portion on a curved part is provided continuously across the entire length of the curved portion of the guide groove.

According to the above-described configuration, the liquid supply tube is regulated not to be projected to an outer circumferential side by the outer circumferential wall. For this reason, it is possible to adjust a degree of curvature of the liquid supply tube by the guide groove, and to further suppress that the liquid supply tube is bent and crushed.

In the recording apparatus described above, it is preferable that in the guide groove, an inner circumferential wall on the inside of the curved portion on a curved part is provided intermittently. It is preferable that, at a part where the inner circumferential wall in the guide groove is cut out, a protruding portion which protrudes toward the inside of the curved portion from the outer circumferential wall, and presses the liquid supply tube stored in the guide groove is provided.

According to the above-described configuration, the liquid supply tube which is stored in the guide groove is pressed by the protruding portion. For this reason, the liquid supply tube is unlikely to be detached from the guide groove. In addition, since the inner circumferential wall is cut out at the position where the protruding portion is provided, it is possible to assemble the liquid supply tube to the guide groove through this cut-out part even when the protruding portion is provided.

In the recording apparatus described above, it is preferable that a supporting mechanism to which the liquid storage body is attached is fixed in the storage unit. It is preferable that, in the supporting mechanism, a liquid supply needle which is inserted into the liquid storage body and makes the liquid storage body and the liquid supply tube communicate with each other when the liquid storage body is attached is provided. It is preferable that, as the supporting portion, while a

first supporting portion is provided at a part where the liquid supply tube is drawn out from the supporting mechanism in the storage unit, a second supporting portion is provided at a position which is separated from the first supporting portion in the case. In addition, it is preferable that one pair of side walls are respectively provided in the first supporting portion and the second supporting portion, a distance between the one pair of side walls in the first supporting portion is longer than a diameter of the liquid supply tube, and a distance between the one pair of side walls in the second supporting portion is shorter than the diameter of the liquid supply tube.

An insertion portion which inserts the liquid supply needle is provided in the liquid storage body. However, since the liquid storage body has irregularity in the dimension because of manufacturing tolerance or the like, when attaching the liquid storage body to the supporting mechanism, it is preferable to adjust the position of the liquid supply needle, and to perform positioning of the liquid supply needle and the insertion portion of the liquid storage body.

According to the above-described configuration, since the liquid supply tube is fixed by the second supporting portion, it is possible to suppress that the liquid supply tube is bent and crushed in the storage unit. In addition, since the liquid supply tube is supported to be displaceable by the first supporting portion, it is possible to allow displacement of the liquid supply needle, and to adjust the position of the insertion portion and the liquid supply needle when attaching the liquid storage body to the supporting mechanism.

In addition, in the above-described recording apparatus, at the part where the supporting portion is provided in the storage unit, when the mark which becomes a pair with the mark provided in the liquid supply tube is provided, by matching the positions of the marks which become a pair with each other, it is possible to more precisely position the liquid supply tube.

Furthermore, in the configuration, when the mark which is provided in the storage unit is expressed by the concave/convex part provided on the wall surface of the storage unit, since it is possible to engrave the mark in a process of forming the storage unit, it is possible to reduce the number of manufacturing processes compared to a case where the mark is provided after forming the storage unit.

In the recording apparatus described above, at a part where the supporting portion in the storage unit is provided, a mark which becomes a pair with the mark provided in the liquid supply tube may be provided.

In this configuration, it is also possible to more precisely position the liquid supply tube by matching the positions of the marks which become a pair with each other.

In addition, when the mark which is provided in the recording unit is expressed by the concave/convex part provided on the wall surface of the recording unit, since it is possible to engrave the mark in a process of forming the recording unit, it is possible to reduce the number of manufacturing processes compared to a case where the mark is provided after forming the recording unit.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will be described with reference to the accompanying drawings, wherein like numbers reference like elements.

FIG. **1** is a perspective view illustrating a recording apparatus as an embodiment.

FIG. **2** is a schematic perspective view illustrating a liquid storage body which is used in the recording apparatus.

FIG. **3** is a perspective view illustrating a first liquid storage unit in a state where a lid is opened.

FIG. **4** is a side view of the first liquid storage unit in a state where the lid and a cover are detached.

FIG. **5** is a perspective view illustrating a second supporting portion which is provided in a case of the first liquid storage unit.

FIG. **6** is a side view of a second liquid storage unit in a state where the lid and the cover are detached.

FIG. **7** is a perspective view illustrating the second supporting portion which is provided in a case of the second liquid storage unit.

FIG. **8** is a perspective view illustrating a state where liquid supply tubes are arranged.

FIG. **9** is a perspective view illustrating a state where the liquid supply tubes are arranged inside a recording unit.

FIG. **10** is a schematic view illustrating a state where the liquid supply tubes which cross the inside the recording unit are arranged.

FIG. **11** is a perspective view illustrating an inner structure of the recording apparatus.

FIG. **12** is a perspective view of a supporting portion which guides the liquid supply tube to a repeater inside the recording unit.

FIG. **13** is a sectional view illustrating the liquid supply tube which is connected to the repeater.

DESCRIPTION OF EXEMPLARY EMBODIMENTS

Hereinafter, an embodiment of the recording apparatus will be described with reference to FIGS. **1** to **13**. In addition, the embodiment illustrates an example in which the recording apparatus is specified as an ink jet type printer (hereinafter, simply referred to as a "printer").

As illustrated in FIG. **1**, the printer includes a recording unit **10** which performs recording on a paper sheet P which is an example of a recording medium by ejecting ink which is an example of liquid, and two liquid storage units **20** and **70** which supply the ink to the recording unit **10**. In addition, the liquid storage units **20** and **70** are storage units which store a liquid storage body **40** which will be described later.

A housing **11** is provided in the recording unit **10**, and a recording head **12** which ejects the ink and performs recording on the paper sheet P, and a carriage **13** which supports the recording head **12** are stored in the housing **11**.

The carriage **13** can reciprocate in a scanning direction X which is a width direction of the printer inside the housing **11**, and performs recording (printing) on the paper sheet P by ejecting the ink while the recording head **12** reciprocates in the width direction of the printer according to the movement of the carriage **13**.

A repeater **14** is stored in the housing **11**. A buffer chamber which temporarily stores the ink to be supplied to the recording head **12** from each of the liquid storage units **20** and **70** is provided in the repeater **14**. In the repeater **14**, the ink is supplied to the recording head **12** by excluding the air which flows into the buffer chamber together with the ink.

In addition, in the housing **11**, an operation panel **15** with which a user operates the printer is provided. In addition, as illustrated by an arrow in FIG. **1**, hereinafter, a direction in which a monitor or buttons are oriented in the operation panel **15** is a forward direction of the printer, and a direction opposite to the forward direction is rearward direction.

On a front surface which is positioned on a front side of the printer in the housing **11**, a rectangular discharge port **16** which discharges the recorded paper sheet P to the outside of

the housing **11** is provided inside the housing **11**. The paper sheet P which is discharged from the discharge port **16** is mounted on a paper discharge tray **17**. In addition, below the paper discharge tray **17** on the front surface of the housing **11**, two upper and lower paper supply cassettes **18** are installed to be attachable and detachable. In these paper supply cassettes **18**, it is possible to store a plurality of paper sheets P in a stacked state.

In addition, above the housing **11** of the recording unit **10**, a scanner portion **19** which stores a scanner that reads an image recorded on a document set at a predetermined reading position is provided.

Next, with reference to FIG. **2**, the liquid storage body **40** which is stored in the liquid storage units **20** and **70** will be described.

As illustrated in FIG. **2**, the liquid storage body **40** includes an ink bag **41** which is made of a flexible material, and the ink is stored in the ink bag **41**. In addition, a rectangular ring-shaped handle portion **42** is fixed to an upper end portion of the ink bag **41**. In a connection portion between the ink bag **41** and the handle portion **42**, an IC chip **43** is provided. In the IC chip **43**, a residual amount or a type of the ink which is stored in the ink bag **41** is stored. In addition, in the connection portion between the ink bag **41** and the handle portion **42**, an insertion portion **45** which is covered with a filter or the like, and communicates with the inside of the ink bag **41** through a supply path **44** is provided.

Next, with reference to FIGS. **3** to **5**, a first liquid storage unit **20** which is attached to a right surface of the housing **11** will be described.

As illustrated in FIG. **3**, the first liquid storage unit **20** includes a case **21**, and stays **26**, **27**, and **28** which support three liquid storage bodies **40** stored in the case **21**. The case **21** is configured of a bottom forming member **22** which has a shape of a bottomed box that forms a bottom of the case **21**, a side wall forming member **23** which is linked to an upper end of a side wall which opposes the housing **11** in the bottom forming member **22**, and a lid **24** which is linked to the upper end of the bottom forming member **22** to be rotatable. The lid **24** opens and closes the case **21** by being abutted against and separated from the upper end of the side wall forming member **23**. In addition, the case **21** is formed in a shape of a substantially rectangular parallelepiped.

In the case **21**, the three stays **26**, **27**, and **28** which protrude from a wall surface **25** of the side wall forming member **23** are provided. The liquid storage body **40** is attachable and detachable as the handle portion **42** of the liquid storage body **40** is fitted to each of the stays **26**, **27**, and **28**. In other words, the stays **26**, **27**, and **28** function as a supporting mechanism which supports the liquid storage body **40**. In addition, the liquid storage body **40** which stores, for example, yellow ink, is attached to the stay **26**, the liquid storage body **40** which stores, for example, magenta ink, is attached to the stay **27**, and the liquid storage body **40** which stores, for example, cyan ink, is attached to the stay **28**.

As illustrated in FIG. **4**, ink supply tubes **29***a*, **29***b*, and **29***c* are connected to below each of the stays **26**, **27**, and **28**. One end of each of the ink supply tubes **29***a*, **29***b*, and **29***c* are connected to liquid supply needles **30** which are respectively provided inside the stays **26**, **27**, and **28**. Each of the liquid supply needles **30** is provided to be displaceable inside the stays **26**, **27**, and **28**, and tip ends thereof are exposed. Accordingly, when the liquid storage bodies **40** are assembled to each of the stays **26**, **27**, and **28**, the liquid supply needle **30** spears the insertion portion **45** which is provided in the liquid storage body **40**, and the liquid supply needle **30** is inserted into the liquid storage body **40**. Accordingly, the ink supply tubes **29***a*, **29***b*, and **29***c* which are connected to the liquid supply needles **30**, and the liquid storage bodies **40**, communicate with each other.

In each of the ink supply tubes **29***a*, **29***b*, and **29***c*, three lines are provided being apart at an interval in an extending direction of the ink supply tubes **29***a*, **29***b*, and **29***c*, as the marks. These lines extend continuously across the entire circumference in a circumferential direction which is a direction orthogonal to the extending direction of the ink supply tubes **29***a*, **29***b*, and **29***c*, and have a circular shape. In addition, hereinafter, among the three lines which are provided in each of the ink supply tubes **29***a*, **29***b*, and **29***c*, a line which is provided at a position closest to one end connected to the stays **26**, **27**, and **28** is a first line **31**, and a line which is provided at a position farthest from the end portion connected to the stays **26**, **27**, and **28** is a third line **33**. In addition, among the three lines which are provided in each of the ink supply tubes **29***a*, **29***b*, and **29***c*, a line between the first line **31** and the third line **33** is a second line **32**.

In addition, the ink supply tubes **29***a*, **29***b*, and **29***c* are respectively supported in a curved shape by a plurality of supporting portions which are provided on the wall surface **25** of the side wall forming member **23**, that is, a plurality of supporting portions which are provided in the first liquid storage unit **20**. In addition, a cover which hides the ink supply tubes **29***a*, **29***b*, and **29***c* that are drawn into the case **21** is attached to the inside of the case **21**, but FIG. **4** illustrates a state where the cover, the lid **24**, and the liquid storage body **40** are detached.

Next, a configuration of each supporting portion which is provided on the wall surface **25** of the side wall forming member **23** will be described.

On the wall surface **25** of the side wall forming member **23**, at a part where the ink supply tubes **29***a*, **29***b*, and **29***c* are drawn out from the stays **26**, **27**, and **28**, that is, a part immediately below the stays **26**, **27**, and **28**, first supporting portions **50***a*, **50***b*, and **50***c* which have one pair of side walls that stand from the wall surface **25** are provided. One pair of side walls in the first supporting portions **50***a*, **50***b*, and **50***c* extend in a vertical direction in FIG. **4**, and a distance between the side walls is longer than diameters of the ink supply tubes **29***a*, **29***b*, and **29***c*. For this reason, in the first supporting portions **50***a*, **50***b*, and **50***c*, the ink supply tubes **29***a*, **29***b*, and **29***c* are displaceable in the vertical direction in FIG. **4**, and are assembled in a state of extending in the vertical direction in FIG. **4**.

In addition, at a position which is separated from the first supporting portions **50***a*, **50***b*, and **50***c*, second supporting portions **51***a*, **51***b*, and **51***c* are provided. The second supporting portions **51***a*, **51***b*, and **51***c* are guide grooves, and have one pair of side walls that stand from the wall surface. Among the second supporting portions **51***a*, **51***b*, and **51***c*, the second supporting portions **51***a* and **51***b* which support the ink supply tubes **29***a* and **29***b* are curved, and the second supporting portion **51***c* which supports the ink supply tube **29***c* extend in a shape of a straight line without being curved.

As illustrated in FIG. **5**, in the curved second supporting portion **51***a*, while an outer circumferential wall **52** on the outside of the curved portion is provided continuously across the entire length of the curved portion, an inner circumferential wall **53** on the inside of the curved portion is provided intermittently. In addition, at a part which is cut out by the inner circumferential wall **53**, at a part which is separated the most from the wall surface **25** of the side wall forming member **23** in the outer circumferential wall **52**, one protruding

portion **54** which protrudes toward the inside of the curved portion, that is, the inner circumferential wall **53** side, is provided.

In addition, similarly to the second supporting portion **51***a*, in the second supporting portion **51***b*, while the outer circumferential wall **52** on the outside of the curved portion is provided continuously across the entire length of the curved portion thereof, the inner circumferential wall **53** on the inside of the curved portion is provided intermittently. In addition, at a part which is cut out by the inner circumferential wall **53**, at a part which is separated the most from the wall surface **25** of the side wall forming member **23** in the outer circumferential wall **52**, one protruding portion **54** which protrudes toward the inside of the curved portion is provided.

In addition, as illustrated in FIG. **4**, in the second supporting portion **51***c* which is not curved, while a lower wall **55** which is positioned at a lower part in FIG. **4** is provided continuously across the entire length, an upper wall **56** which is positioned at an upper part in FIG. **4** is provided intermittently. In addition, at a part which is cut out by the upper wall **56**, at a part which is separated the most from the wall surface **25** of the side wall forming member **23** in the lower wall **55**, one protruding portion **54** which protrudes toward the upper wall **56** side is provided.

The distances between one pair of walls in these second supporting portions **51***a*, **51***b*, and **51***c* are shorter than the diameters of the ink supply tubes **29***a*, **29***b*, and **29***c*. In other words, the distances between the outer circumferential wall **52** and the inner circumferential wall **53** in the second supporting portions **51***a* and **51***b* are shorter than the diameters of the ink supply tubes **29***a* and **29***b*. In addition, the distance between the lower wall **55** and the upper wall **56** in the second supporting portion **51***c* is shorter than the diameter of the ink supply tube **29***c*. For this reason, in the second supporting portions **51***a*, **51***b*, and **51***c*, the ink supply tubes **29***a*, **29***b*, and **29***c* which are assembled to the second supporting portions **51***a*, **51***b*, and **51***c* are fixed along the shapes of the second supporting portions **51***a*, **51***b*, and **51***c*.

In addition, below the second supporting portion **51***b*, a third supporting portion **57** which supports the ink supply tube **29***c* is provided. The third supporting portion **57** is a curved guide groove, and has one pair of curved side walls. In addition, similarly to the second supporting portions **51***a* and **51***b*, in the third supporting portion **57**, while an outer circumferential wall on the outside of the curved portion is provided continuously across the entire length of the curved portion, an inner circumferential wall on the inside of the curved portion is provided intermittently. In addition, at a part which is cut out by the inner circumferential wall, at a part which is separated the most from the wall surface **25** of the side wall forming member **23** in the outer circumferential wall, the protruding portion **54** which protrudes toward the inside of the curved portion is provided. In addition, one protruding portion **54** is provided in the third supporting portion **57**. In addition, the distance between one pair of side walls in the third supporting portion **57** is shorter than the diameter of the ink supply tube **29***c*. For this reason, when the ink supply tube **29***c* is assembled to the third supporting portion **57**, the ink supply tube **29***c* is fixed along the third supporting portion **57**.

In this manner, the ink supply tube **29***a* which is connected to the stay **26** is supported by the first supporting portion **50***a* and the second supporting portion **51***a*. In addition, the ink supply tube **29***b* which is connected to the stay **27** is supported by the first supporting portion **50***b* and the second supporting portion **51***b*. In addition, the ink supply tube **29***c* which is connected to the stay **28** is supported by the first supporting portion **50***c*, the second supporting portion **51***c*, and the third supporting portion **57**.

Here, in the side wall forming member **23**, a plurality of triangular marks **59** which are expressed by convex portions are engraved on the wall surface **25**. Tip ends of angles of the marks **59** are arranged to point one end of the second supporting portions **51***a*, **51***b*, and **51***c*. In addition, since the marks **59** are engraved by the convex portions on the wall surface **25**, concave/convex portions which are provided on the wall surface **25** express the mark **59**.

Each of the ink supply tubes **29***a*, **29***b*, and **29***c* is arranged so that the first lines **31** which are provided in the ink supply tubes **29***a*, **29***b*, and **29***c* are positioned at one end of the second supporting portions **51***a*, **51***b*, and **51***c*. In other words, each of the ink supply tubes **29***a*, **29***b*, and **29***c* are arranged so that the first line **31** in the ink supply tubes **29***a*, **29***b*, and **29***c* is positioned at substantially the same position as the position which is indicated by the triangular mark **59** provided in the case **21**.

The ink supply tubes **29***a*, **29***b*, and **29***c* which are supported in this manner are drawn to the outside of the case **21** through a tube insertion hole **60** which is provided in the side wall forming member **23**.

In addition, the ink supply tubes **29***a*, **29***b*, and **29***c* which are drawn to the outside of the case **21**, are introduced to the inside of the housing **11** of the recording unit **10**, and are connected to the repeater **14**. The repeater **14** is connected to the recording head **12** through an ink supply system which is provided in the recording unit **10**. For this reason, when the liquid storage bodies **40** are attached to each of the stays **26**, **27**, and **28** provided in the first liquid storage unit **20**, the ink which is stored in the liquid storage body **40** can be supplied to the recording head **12** via the repeater **14**.

Next, with reference to FIGS. **1** to **6**, the second liquid storage unit **70** which is attached to a left surface of the housing **11** will be described.

As illustrated in FIG. **1**, similarly to the first liquid storage unit **20**, the second liquid storage unit **70** is provided with a case **71**. The case **71** is configured of a bottom forming member **72** which has a shape of a bottomed box that forms a bottom of the case **71**, a side wall forming member **73** which is linked to an upper end of a side wall which opposes the housing **11** in the bottom forming member **72**, and a lid **74** which is linked to the upper end of the bottom forming member **72** to be rotatable. The lid **74** opens and closes the case **71** by being abutted against and separated from the upper end of the side wall forming member **73**. In addition, the case **71** is formed in a shape of a substantially rectangular parallelepiped.

One liquid storage body **40** is stored in the case **71**. In the liquid storage body **40**, for example, black ink is stored, and the ink bag **41** which is made of a flexible material that has a larger amount than that of the liquid storage body **40** provided in the first liquid storage unit **20**, and the rectangular ring-shaped handle portion **42** which is fixed to the upper end portion of the ink bag **41** are provided.

As illustrated in FIG. **6**, in the case **71**, one stay **76** which protrudes from a wall surface **75** of the side wall forming member **73** is provided. The liquid storage body **40** is attachable and detachable as the handle portion **42** of the liquid storage body **40** is fitted to the stay **76**. In other words, the stay **76** functions as the supporting mechanism which supports the liquid storage body **40**.

An ink supply tube **77** is connected to below the stay **76**. The ink supply tube **77** is connected to a liquid supply needle **78** which is provided inside the stay **76**. The liquid supply

needle **78** is provided to be displaceable inside the stay **76**, and tip end thereof is exposed. Accordingly, when the liquid storage body **40** is assembled to the stay **76**, the liquid supply needle **78** spears the insertion portion **45** which is provided in the liquid storage body **40**, and the liquid supply needle **78** is inserted into the liquid storage body **40**. Accordingly, the ink supply tube **77** which is connected to the liquid supply needle **78**, and the liquid storage body **40**, communicate with each other.

In the ink supply tube **77**, as a mark, one line **79** is provided. The line **79** extends continuously across the entire circumference in the circumferential direction which is a direction orthogonal to the extending direction of the ink supply tube **77**, and has a circular shape.

The ink supply tube **77** is supported in a curved shape by the plurality of supporting portions which are provided on the wall surface **75** of the side wall forming member **73**, that is, the plurality of supporting portions which are provided in the second liquid storage unit **70**. In addition, a cover which hides the ink supply tube **77** that is drawn into the case **71** is attached to the inside of the case **71**, but FIG. **6** illustrates a state where the cover, the lid **74**, and the liquid storage body **40** are detached.

Next, a configuration of each supporting portion which is provided on the wall surface **75** of the side wall forming member **73** will be described.

On the wall surface **75** of the side wall forming member **73**, at a part where the ink supply tube **77** is drawn out from the stay **76**, that is, a part immediately below the stay **76**, a first supporting portion **80** which has one pair of side walls that stand from the wall surface **75** is provided. One pair of side walls in the first supporting portion **80**, extend in a vertical direction in FIG. **6**, and a distance between the side walls is longer than diameters of the ink supply tube **77**. For this reason, in the first supporting portion **80**, the ink supply tube **77** is displaceable in the vertical direction in FIG. **6**, and is assembled in a state of extending in the vertical direction in FIG. **6**.

In addition, at a position which is separated from the first supporting portion **80**, a second supporting portion **81** is provided. The second supporting portion **81** is a guide groove, and has one pair of side walls that stand from the wall surface. The second supporting portion **81** is provided with a straight line portion **82** which extends in a shape of a straight line in a horizontal direction in FIG. **6**, and a curved portion **83** which is curved by 90° upward from the straight line portion **82**.

In the straight line portion **82**, while a lower wall **84** which is positioned at a lower part in FIG. **6** is provided continuously across the entire length, an upper wall **85** which is positioned at an upper part in FIG. **6** is provided intermittently. In addition, at a part which is cut out by the upper wall **85**, at a part which is separated the most from the wall surface **75** of the side wall forming member **73** in the lower wall **84**, one protruding portion **86** which protrudes toward the upper wall **85** side is provided.

In addition, as illustrated in FIGS. **6** and **7**, in the curved portion **83**, while an outer circumferential wall **87** on the outside of the curved portion **83** is provided continuously across the entire length of the curved portion **83**, an inner circumferential wall **88** on the inside of the curved portion **83** is provided intermittently. In addition, at a part which is cut out by the inner circumferential wall **88**, at a part which is separated the most from the wall surface **75** of the side wall forming member **73** in the outer circumferential wall **87**, one protruding portion **86** which protrudes toward the inner side of the curved portion **83**, that is, the inner circumferential wall **88** side, is provided.

A distance between one pair of walls in the second supporting portion **81** is shorter than a diameter of the ink supply tube **77**. In other words, a distance between the lower wall **84** and the upper wall **85** in the straight line portion **82** is shorter than the diameter of the ink supply tube **77**. In addition, a distance between the outer circumferential wall **87** and the inner circumferential wall **88** in the curved portion **83** is also shorter than the diameter of the ink supply tube **77**. For this reason, in the second supporting portion **81**, the ink supply tube **77** which is assembled to the second supporting portion **81** is fixed along the shape of the second supporting portion **81**.

In addition, above the curved portion **83** of the second supporting portion **81**, a third supporting portion **89** which has one pair of side walls that stand from the wall surface **75** of the side wall forming member **73** is provided. The one pair of side walls in the third supporting portion **89** extend in the vertical direction in FIG. **6**, and a distance between the side walls is shorter than the diameter of the ink supply tube **77**. For this reason, in the third supporting portion **89**, the ink supply tube **77** is fixed in a state of extending in the vertical direction in FIG. **6**.

Here, in the side wall forming member **73**, a triangular mark **90** which is expressed by a convex portion is engraved on the wall surface **75**. A tip end of an angle of the mark **90** is arranged to point one end of the second supporting portion **81**. In addition, since the mark **90** is engraved by a convex portion on the wall surface **75**, concave/convex portions which are provided on the wall surface **75** express the mark **90**.

The ink supply tube **77** is supported by the first supporting portion **80**, the second supporting portion **81**, and the third supporting portion **89** so that the line **79** which is provided in the ink supply tube **77** is positioned at one end of the second supporting portion **81**. In other words, the position of the line **79** in the ink supply tube **77** is arranged to be substantially the same as the position indicated by the triangular mark **90** provided in the case **71**.

The ink supply tube **77** which is supported in this manner is drawn to the outside of the case **71** through a tube insertion hole **91** which is provided in the side wall forming member **73**.

In addition, the ink supply tube **77** which is drawn to the outside of the case **71**, is introduced to the inside of the housing **11** of the recording unit **10**, and is connected to the repeater **14**. Accordingly, when the liquid storage body **40** is attached to the stay **76** provided in the second liquid storage unit **70**, the ink which is stored in the liquid storage body **40** can be supplied to the recording head **12** via the repeater **14**.

Next, with reference to FIGS. **8** to **13**, a state of arrangement of the ink supply tubes **29***a*, **29***b*, **29***c*, and **77** inside the recording unit **10** will be described.

In FIG. **8**, the recording unit **10** in a state where a part of the housing **11** is detached is illustrated.

As illustrated in FIG. **8**, in the housing **11**, a tunnel member **100** is provided. The tunnel member **100** has a shape of a reverse U of which a lower end is opened, and the lower end thereof sticks into a main body frame **101** which constitutes a part of the housing **11**. In the tunnel member **100**, a through hole **102** which extends in the vertical direction is formed. The ink supply tubes **29***a*, **29***b*, and **29***c* are inserted into the through hole **102**. The width of the through hole **102** is only slightly wider than the diameter of the ink supply tubes **29***a*, **29***b*, and **29***c*. For this reason, when the ink supply tubes **29***a*, **29***b*, and **29***c* are inserted into the tunnel member **100**, each of the ink supply tubes **29***a*, **29***b*, and **29***c* is supported in a state of being aligned in a longitudinal direction. In other words, the tunnel member **100** functions as the supporting portion

which supports the ink supply tubes **29***a*, **29***b*, and **29***c*. In the tunnel member **100**, a rib **103** which extends in the vertical direction is formed. The ink supply tubes **29***a*, **29***b*, and **29***c* are arranged so that the second line **32** which is provided in the ink supply tubes **29***a*, **29***b*, and **29***c* overlaps with the rib **103**.

In addition, as illustrated in FIG. **4**, the tunnel member **100** is provided at a position which is exposed to the inside of the case **21** from the tube insertion hole **60** when the case **21** of the first liquid storage unit **20** is attached thereto.

In addition, as illustrated in FIGS. **8** and **9**, in the main body frame **101**, an opening **104** for drawing the ink supply tubes **29***a*, **29***b*, and **29***c* toward the repeater **14** is provided. A protection member **105** which suppresses that the ink supply tubes **29***a*, **29***b*, and **29***c* are rubbed with an end portion of the opening **104** by covering the end portion of the opening **104**, is fitted to the opening **104**. In addition, in the main body frame **101**, a board portion **106** which is connected to the opening **104** and extends along the scanning direction X is formed.

In addition, as illustrated in FIG. **10**, in the board portion **106**, a parallel supporting portion **107** which extends along the scanning direction X and supports each of the ink supply tubes **29***a*, **29***b*, and **29***c* in a state where the ink supply tubes **29***a*, **29***b*, and **29***c* are aligned in a shape of a straight line is provided. The parallel supporting portion **107** has three half-cylindrical fitting portions. The ink supply tubes **29***a*, **29***b*, and **29***c* are arranged so that the third line **33** which is provided in the ink supply tubes **29***a*, **29***b*, and **29***c* is positioned at one end of the parallel supporting portion **107**.

In this manner, the ink supply tubes **29***a*, **29***b*, and **29***c* are arranged in the scanning direction X in a state of being fixed to the parallel supporting portion **107**, and crosses the main body frame **101** after being drawn into the main body frame **101** from the protection member **105** (opening **104**).

In addition, as illustrated in FIG. **11**, on the further inner side (right side in FIG. **11**) than the repeater **14** in the scanning direction X, a curved auxiliary member **108** for making the ink supply tubes **29***a*, **29***b*, and **29***c* curved upward is provided.

As illustrated in FIG. **12**, in the curved auxiliary member **108**, the ink supply tubes **29***a*, **29***b*, and **29***c* are wound to have a spiral shape around an axial line which extends in the vertical direction.

In addition, as illustrated in FIG. **11**, the ink supply tubes **29***a*, **29***b*, and **29***c* which are guided upward by the curved auxiliary member **108** are guided to the inside of the repeater **14** from a first inlet **109** of the repeater **14**.

As illustrated in FIG. **13**, four connection portions **110***a*, **110***b*, **110***c*, and **110***d* which correspond to each of the ink supply tubes **29***a*, **29***b*, **29***c*, and **77** are provided in the repeater **14**. The ink supply tubes **29***a*, **29***b*, and **29***c* which are drawn from the first liquid storage unit **20** are connected to three connection portions **110***a*, **110***b*, and **110***c* among the connection portions. A clamp **111** is provided inside the first inlet **109** in the repeater **14**. The ink supply tubes **29***a*, **29***b*, and **29***c* are respectively fixed by the clamp **111**.

In addition, as illustrated in FIGS. **11** and **13**, the ink supply tube **77** which is drawn to the outside of the case **71** of the second liquid storage unit **70** is guided to an opening **112** which is provided in the housing **11**, and to the inside of the repeater **14** through a second inlet **113** of the repeater **14**. Among the connection portions **110***a*, **110***b*, **110***c*, and **110***d* which are provided in the repeater **14**, the ink supply tube **77** which is drawn from the second liquid storage unit **70** is connected to the connection portion **110***d* which is positioned at a left end in FIG. **13**. The clamp **114** is provided inside the second inlet **113** in the repeater **14**. The ink supply tube **77** is fixed by the clamp **114**.

Next, an action of the above-described embodiment will be described.

Since the ink supply tubes **29***a*, **29***b*, **29***c*, and **77** which are provided in the printer are supported by each supporting portion, in a state where the ink supply tubes **29***a*, **29***b*, **29***c*, and **77** are arranged in the printer, it is suppressed that the ink supply tubes **29***a*, **29***b*, **29***c*, and **77** are bent and crushed.

However, only by providing each supporting portion, there is a concern that the ink supply tubes **29***a*, **29***b*, **29***c*, and **77** are arranged in a bent and crushed state from the beginning, and supported by each supporting portion as in such a bent and crushed state.

In contrast, in the embodiment, the lines **31**, **32**, **33**, and **79** which are references of parts supported by each supporting portion are provided in the ink supply tubes **29***a*, **29***b*, **29***c*, and **77**. In addition, when assembling the ink supply tubes **29***a*, **29***b*, **29***c*, and **77** to the printer, the positions thereof match the positions where the ink supply tubes **29***a*, **29***b*, **29***c*, and **77** are supported by each supporting portion by using the lines **31**, **32**, **33**, and **79** as references. Accordingly, at an appropriate part where the ink supply tubes **29***a*, **29***b*, **29***c*, and **77** are not bent and crushed, the ink supply tubes **29***a*, **29***b*, **29***c*, and **77** are supported.

In addition, since the outer circumferential walls **52** and **87** on the outside of the curved portion are provided continuously across the entire length of the curved portion at the curved parts in each supporting portion, the ink supply tubes **29***a*, **29***b*, **29***c*, and **77** are regulated not to be projected to the outer circumferential side by the outer circumferential walls **52** and **87**. Accordingly, degrees of curvature of the ink supply tubes **29***a*, **29***b*, **29***c*, and **77** are adjusted.

In addition, at the curved parts in each supporting portion, the inner circumferential walls **53** and **88** on the inside of the curved portion are provided intermittently, and at the part which is cut out by the inner circumferential walls **53** and **88**, the protruding portions **54** and **86** which protrude toward the inside of the curved portion from the outer circumferential walls **52** and **87** are provided. For this reason, the ink supply tubes **29***a*, **29***b*, **29***c*, and **77** which are stored in the supporting portion are pressed by the protruding portions **54** and **86**, and unlikely to be detached. In addition, since the inner circumferential walls **53** and **88** are cut out at the position where the protruding portions **54** and **86** are provided, it is possible to assemble the ink supply tubes **29***a*, **29***b*, **29***c*, and **77** to each supporting portion through the cut-out part even when the protruding portions **54** and **86** are provided.

Here, the insertion portion **45** which inserts the liquid supply needles **30** and **78** into the liquid storage body **40** is provided, but the liquid storage body **40** has irregularity in the dimension thereof due to manufacturing tolerance. For this reason, when attaching the liquid storage body **40** to each of the stays **26**, **27**, **28**, and **76**, it is desirable to match the positions of the liquid supply needles **30** and **78** and the position of the insertion portion **45** of the liquid storage body **40** by adjusting the positions of the liquid supply needles **30** and **78**.

In the embodiment, since the ink supply tubes **29***a*, **29***b*, **29***c*, and **77** are supported by the first supporting portions **50***a*, **50***b*, **50***c*, and **80** to be displaceable, displacement of the liquid supply needles **30** and **78** is allowed, and adjustment of the positions of the insertion portion **45** of the liquid storage body **40** and the liquid supply needles **30** and **78** is allowed when attaching the liquid storage body **40** to each of the stays **26**, **27**, **28**, and **76**.

In addition, in the ink supply tubes **29***a*, **29***b*, and **29***c* which are connected to each of the stays **26**, **27**, and **28** of the first liquid storage unit **20**, the plurality of lines **31**, **32**, and **33** are provided being apart at an interval in the extending direction of the ink supply tubes **29***a*, **29***b*, and **29***c*. For this reason, when assembling the ink supply tubes **29***a*, **29***b*, and **29***c* to the housings **11** and **21**, it is possible to position the ink supply tubes **29***a*, **29***b*, and **29***c* at multiple locations.

Furthermore, since the lines **31**, **32**, and **33** are lines which extend along the circumferential direction of the ink supply tubes **29***a*, **29***b*, and **29***c*, it is possible to indicate a narrow range in the extending direction of the ink supply tubes **29***a*, **29***b*, and **29***c*, and more precise positioning is performed by matching the positions by using the lines as references.

In addition, the lines **31**, **32**, and **33** which are provided in the ink supply tubes **29***a*, **29***b*, and **29***c* are circular lines across the entire circumference of the ink supply tubes **29***a*, **29***b*, and **29***c*. For this reason, even when the ink supply tubes **29***a*, **29***b*, and **29***c* are in a twisted state, it is possible to visually recognize the lines **31**, **32**, and **33** which are the marks provided in the ink supply tubes **29***a*, **29***b*, and **29***c*.

In addition, in the embodiment, in the ink supply tubes **29***a*, **29***b*, and **29***c* which are connected to each of the stays **26**, **27**, and **28** of the first liquid storage unit **20**, the first line **31** is arranged corresponding to the triangular mark **59** provided in the case **21**. In addition, the second line **32** is arranged corresponding to the rib **103** of the tunnel member **100**. In addition, the third line **33** is arranged corresponding to a tip end of the parallel supporting portion **107**. In other words, the first line **31** and the triangular mark **59** become a pair, the second line **32** and the rib **103** become a pair, and the third line **33** and the parallel supporting portion **107** become a pair, and the ink supply tubes **29***a*, **29***b*, and **29***c* are arranged to match the positions of the marks which become a pair with each other. For this reason, a difference in supporting position becomes small, and more precise positioning of the ink supply tubes **29***a*, **29***b*, and **29***c* is performed.

In addition, since the rib **103** which is a convex portion is formed in the tunnel member **100** which is a part of the housing **11** of the recording unit **10**, and the rib **103** is used as a mark which is a reference of positioning, it is possible to engrave the mark in a process of forming the housing **11**, and the number of manufacturing processes is reduced compared to a case where the mark is provided after forming the housing **11**.

In addition, in the ink supply tube **77** which is connected to the stay **76** of the second liquid storage unit **70**, since the line **79** which extends along the circumferential direction of the ink supply tube **77** is provided, it is possible to indicate a narrow range in the extending direction of the ink supply tube **77**, and more precise positioning is performed by matching the positions by using the line **79** as a reference.

Furthermore, since the line **79** which is provided in the ink supply tube **77** is a circular line across the entire circumference of the ink supply tube **77**, even when the ink supply tube **77** is in a twisted state, it is possible to visually recognize the line **79** which is the mark provided in the ink supply tube **77**.

In addition, in the embodiment, in the ink supply tube **77** which is connected to the stay **76** of the second liquid storage unit **70**, by making the line **79** correspond to the triangular mark **90** provided in the case **71**, and using these as a pair, the ink supply tube **77** is arranged so that the positions of the marks which are a pair match each other. For this reason, a difference in the supporting positions is reduced, and more precise positioning of the ink supply tube **77** is performed.

In addition, in the embodiment, the triangular marks **59** and **90** which are provided in the cases **21** and **71** of the liquid storage unit **20** and **70** are expressed by the concave/convex parts provided on the wall surfaces **25** and **75** of the cases **21** and **71**. For this reason, it is possible to engrave the marks **59** and **90** in the process of forming the cases **21** and **71**, and to reduce the number of manufacturing processes compared to a case where the marks **59** and **90** are provided after forming the cases **21** and **71**.

According to the above-described embodiment, the following effects can be obtained.

(1) Since the lines **31**, **32**, **33**, and **79** which are used as references of the parts supported by the supporting portion are provided in the ink supply tubes **29***a*, **29***b*, **29***c*, and **77**, it is possible to suppress that the ink supply tubes **29***a*, **29***b*, **29***c*, and **77** are arranged in a bent and crushed state from the beginning. Therefore, it is possible to suppress that the ink supply tubes **29***a*, **29***b*, **29***c*, and **77** are bent and crushed by appropriately supporting the ink supply tubes **29***a*, **29***b*, **29***c*, and **77**. Furthermore, it is possible to suppress that a flow of the liquid in the ink supply tubes **29***a*, **29***b*, **29***c*, and **77** deteriorates, and that printing error or the like is generated.

(2) The curved second supporting portions **51***a*, **51***b*, and **81**, and the outer circumferential walls **52** and **87** of the third supporting portion **57** are provided continuously across the entire length of the curved portion. For this reason, the ink supply tubes **29***a*, **29***b*, **29***c*, and **77** are regulated not to be projected to the outer circumferential side, and it is possible to further suppress that the ink supply tubes **29***a*, **29***b*, **29***c*, and **77** are bent and crushed.

(3) The bent second supporting portions **51***a*, **51***b*, and **81**, and the inner circumferential walls **53** and **88** of the third supporting portion **57** are provided intermittently, the protruding portions **54** and **86** are provided at the part which is cut out by the inner circumferential walls **53** and **88**. For this reason, the ink supply tubes **29***a*, **29***b*, **29***c*, and **77** are unlikely to be detached from the supporting portion, and it is possible to assemble the ink supply tubes **29***a*, **29***b*, **29***c*, and **77** even when the protruding portions **54** and **86** are provided.

(4) The distances between the one pair of side walls in the first supporting portions **50***a*, **50***b*, **50***c*, and **80** are longer than the diameters of the ink supply tubes **29***a*, **29***b*, **29***c*, and **77**, and the distances between the one pair of side walls in the second supporting portions **51***a*, **51***b*, **51***c*, and **81** are shorter than the diameters of the ink supply tubes **29***a*, **29***b*, **29***c*, and **77**. For this reason, it is possible to suppress that the ink supply tubes **29***a*, **29***b*, **29***c*, and **77** are bent and crushed in the cases **21** and **71**, and to adjust the positions of the insertion portion **45** of the liquid storage body **40** and the liquid supply needles **30** and **78** when attaching the liquid storage body **40** to each of the stays **26**, **27**, **28**, and **76**.

(5) Since the plurality of lines **31**, **32**, and **33** are provided in the ink supply tubes **29***a*, **29***b*, and **29***c*, which are connected to the stays **26**, **27**, and **28** of the first liquid storage unit **20**, when assembling the ink supply tubes **29***a*, **29***b*, and **29***c*, it is possible to position the ink supply tubes **29***a*, **29***b*, and **29***c* at multiple locations, and to adjust the shapes thereof to be more detailed.

(6) Since the lines which are provided in the ink supply tubes **29***a*, **29***b*, **29***c*, and **77** are the lines which extend along the circumferential direction which is the direction orthogonal to the extending direction of the ink supply tubes **29***a*, **29***b*, **29***c*, and **77**, by matching the positions by using the lines as the references, it is possible to more precisely position the ink supply tubes **29***a*, **29***b*, **29***c*, and **77**.

(7) The lines which are provided in the ink supply tubes **29***a*, **29***b*, **29***c*, and **77** are the circular lines across the entire length of the ink supply tubes **29***a*, **29***b*, **29***c*, and **77**. For this reason, it is possible to easily perform positioning by visually

recognizing the lines which are the marks provided in the ink supply tubes **29***a*, **29***b*, **29***c*, and **77** even when the ink supply tubes **29***a*, **29***b*, **29***c*, and **77** are twisted.

(8) At the part where the second supporting portions **51***a*, **51***b*, **51***c*, and **81** of the cases **21** and **71** are provided, the triangular marks **59** and **90** which become a pair with the lines provided in the ink supply tubes **29***a*, **29***b*, **29***c*, and **77** are provided. For this reason, by matching the positions of the marks which become a pair with each other, it is possible to more precisely position the ink supply tubes **29***a*, **29***b*, **29***c*, and **77**.

(9) Since the triangular marks **59** and **90** which are provided in the cases **21** and **71** are expressed by the concave/convex parts provided on the wall surfaces **25** and **75** of the cases **21** and **71**, it is possible to engrave the marks **59** and **90** in the process of forming the cases **21** and **71**, and to reduce the number of manufacturing processes compared to a case where the marks **59** and **90** are provided after forming the cases **21** and **71**.

(10) Since the rib **103** which serves as a mark that becomes a pair with the line **32** that is a mark provided in the ink supply tubes **29***a*, **29***b*, and **29***c* is provided in the tunnel member **100**, by matching the positions of the marks which become a pair with each other, it is possible to more precisely position the ink supply tubes **29***a*, **29***b*, and **29***c*.

(11) Since the mark provided in the tunnel member **100** is the rib **103** formed in the tunnel member **100**, it is possible to provide the mark in the process of the tunnel member **100**, and to reduce the number of manufacturing processes compared to a case where the mark is provided after forming the tunnel member **100**.

In addition, the above-described embodiment can be changed and realized as follows.

The plurality of marks may be provided being apart at an interval in the extending direction in the ink supply tube **77** which is connected to the stay **76** of the second liquid storage unit **70**. In this case, the ink supply tube **77** may be assembled to each of the supporting portions **80**, **81**, and **89** by making the marks and one end of each of the supporting portions **80**, **81**, and **89** correspond to each other.

When the plurality of marks are provided in the ink supply tubes **29***a*, **29***b*, **29***c*, and **77**, marks which are different from each other may be used. For example, colors, shapes, or design of the marks may be different from each other.

The triangular marks may be engraved as concave portions in the cases **21** and **71**.

An example in which the marks are expressed by the concave/convex parts provided on the wall surfaces **25** and **75** is described, but since a mark of which a position can be confirmed may be employed, it is possible to express the mark in another method. For example, a configuration in which a mark is drawn by paint, or a configuration in which a component which is a sign as a mark is attached, can be employed.

The marks provided in the cases **21** and **71** may be colored. In this case, by making the colors of each mark different from each other, the colors of the marks in the ink supply tubes **29***a*, **29***b*, **29***c*, and **77** may correspond to the same colors as the colors of the marks provided in the cases. According to this configuration, it is easier to understand correspondence between the marks provided in the ink supply tubes **29***a*, **29***b*, **29***c*, and **77** and the marks provided in the cases.

A mark may be provided at a part other than the part where the second supporting portions **51***a*, **51***b*, **51***c*, and **81** of the cases **21** and **71** are provided. For example, a mark may be provided at a part where the first supporting portions **50***a*, **50***b*, **50***c*, and **80** are provided, or at a part where the third supporting portions **57** and **89** are provided.

The mark provided in the cases **21** and **71** may have a shape other than a triangular shape. For example, a line, a circle, a square, or other symbols may be employed.

Three liquid storage bodies **40** are stored in the first liquid storage unit **20**, and one liquid storage body **40** is stored in the second liquid storage unit **70**, but the number of the liquid storage bodies **40** may be appropriately changed. In addition, at least only one of the first liquid storage unit **20** and the second liquid storage unit **70** may be provided.

In each supporting portion, the number of protruding portions **54** and **86** may be appropriately changed.

The number of supporting portions which are provided in the case **21** of the first liquid storage unit **20** may be appropriately changed.

The number of supporting portions which are provided in the case **71** of the second liquid storage unit **70** may be appropriately changed.

A mark which is different from the rib **103** may be formed in the tunnel member **100**. Since a mark of which a position can be confirmed may be employed, for example, a groove which extends in the vertical direction may be formed. In addition, a configuration in which a mark is drawn by paint, or a configuration in which a component which is a sign as a mark is attached, can be employed. In addition, the tunnel member **100** and the rib **103** may be separately molded and fixed by performing adhering or the like.

In the board portion **106** of the housing **11** of the recording unit **10**, the mark which becomes a pair with the third line **33** provided in the ink supply tubes **29***a*, **29***b*, and **29***c* at the part where the parallel supporting portion **107** is provided, for example, a mark which indicates a part where one end of the parallel supporting portion **107** is positioned may be provided. According to this configuration, by matching the positions of the marks which become a pair with each other, it is possible to more precisely position the ink supply tubes **29***a*, **29***b*, and **29***c*. In addition, in this configuration, when the mark provided in the housing **11** is expressed by the concave/convex parts provided on the wall surface of the board portion **106**, since it is possible to engrave the mark in the process of forming the housing **11**, it is possible to reduce the number of manufacturing processes compared to a case where the mark is provided after forming the housing **11**.

The triangular marks may not be provided in the cases **21** and **71**. Even in this case, the ink supply tubes **29***a*, **29***b*, **29***c*, and **77** are assembled so that the lines **31** and **79** match one end of the second supporting portions **51***a*, **51***b*, **51***c*, and **81**. Accordingly, it is possible to support the ink supply tubes **29***a*, **29***b*, **29***c*, and **77** at an appropriate part where the ink supply tubes **29***a*, **29***b*, **29***c*, and **77** are not bent and crushed.

The lines **31**, **32**, **33**, and **79** provided in the ink supply tubes **29***a*, **29***b*, **29***c*, and **77** may not be the circular lines across the entire circumference. For example, the lines **31**, **32**, **33**, and **79** which extend in the circumferential direction may be provided intermittently, for example, a part in the circumferential direction is cut out.

Other symbols except for the line which serves as the mark provided in the ink supply tubes **29***a*, **29***b*, **29***c*, and **77** may be used. For example, a circular or a triangular symbol may be used.

The number of marks provided in the ink supply tubes **29***a*, **29***b*, and **29***c* may be appropriately changed if the number is 1 or more.

The distances between the one pair of side walls in the first supporting portions **50***a*, **50***b*, **50***c*, and **80** may be the same as the diameters of the ink supply tubes **29***a*, **29***b*, **29***c*, and **77**, and may be shorter than the diameters of the ink supply tubes **29***a*, **29***b*, **29***c*, and **77**.

The protruding portions **54** and **86** are provided in each supporting portion, but the protruding portions **54** and **86** may not be provided. In this case, it is not necessary to intermittently provide the inner circumferential walls **53** and **88**, or the upper walls **56** and **85**.

The outer circumferential walls **52** and **87** or the lower walls **55** and **84** may be provided intermittently. For example, when the length of the cut-out part is shorter than the diameters of the ink supply tubes **29***a*, **29***b*, **29***c*, and **77**, it is not necessary to intermittently provide the outer circumferential walls **52** and **87** or the lower walls **55** and **84**.

When the liquid storage body **40** is empty, a replaceable type which replaces the liquid storage body **40** with the new liquid storage body **40** which is fully filled with the ink may be employed, or an injection type which injects the ink into the empty liquid storage body may be employed.

The liquid storage units **20** and **70** may be provided in the recording unit **10**. In this case, the liquid storage body **40** which is stored in the liquid storage units **20** and **70** is also provided inside the recording unit **10**.

In the above-described embodiment, the recording apparatus may be a liquid ejecting apparatus which performs recording by ejecting or discharging liquid other than the ink. For example, the recording apparatus may be a liquid body ejecting apparatus which performs recording by ejecting a liquid body that includes a dispersed or dissolved material, such as an electrode material or a coloring material (pixel material), which is used in manufacturing a liquid-crystal display, an electroluminescence (EL) display, and a surface light emission display. In addition, the recording apparatus may be a fluid ejecting apparatus which ejects a fluid, such as gel (for example, physical gel).

The entire disclosure of Japanese Patent Application No. 2014-155906, filed Jul. 31, 2014 is expressly incorporated by reference herein.

What is claimed is:

1. A recording apparatus, comprising:
a recording head which performs recording by ejecting liquid onto a recording medium;
a recording unit which stores the recording head;
a storage unit which is provided outside the recording unit, and stores a liquid storage body that stores the liquid to be ejected from the recording head;
a liquid supply tube which supplies the liquid that is stored in the liquid storage body stored in the storage unit to the recording head; and
a supporting portion which is provided in at least one of the recording unit and the storage unit, and supports the liquid supply tube,
wherein a mark which is a reference of a part supported by the supporting portion is provided in the liquid supply tube.

2. The recording apparatus according to claim **1**,
wherein the supporting portion includes a guide groove which stores the liquid supply tube, and
wherein, in the guide groove, an outer circumferential wall on the outside of a curved portion on a curved part is provided continuously across the entire length of the curved portion of the guide groove.

3. The recording apparatus according to claim **2**,
wherein, in the guide groove, an inner circumferential wall on the inside of the curved portion on a curved part is provided intermittently, and
wherein, at a part where the inner circumferential wall in the guide groove is cut out, a protruding portion which protrudes toward the inside of the curved portion from the outer circumferential wall, and presses the liquid supply tube stored in the guide groove is provided.

4. The recording apparatus according to claim **1**,
wherein a supporting mechanism to which the liquid storage body is attached is fixed in the storage unit,
wherein, in the supporting mechanism, a liquid supply needle which is inserted into the liquid storage body and makes the liquid storage body and the liquid supply tube communicate with each other when the liquid storage body is attached is provided,
wherein, as the supporting portion, while a first supporting portion is provided at a part where the liquid supply tube is drawn out from the supporting mechanism in the storage unit, a second supporting portion is provided at a position which is separated from the first supporting portion in the case, and
wherein one pair of side walls are respectively provided in the first supporting portion and the second supporting portion, a distance between the one pair of side walls in the first supporting portion is longer than a diameter of the liquid supply tube, and a distance between the one pair of side walls in the second supporting portion is shorter than the diameter of the liquid supply tube.

5. The recording apparatus according to claim **1**,
wherein, at a part where the supporting portion in the storage unit is provided, a mark which becomes a pair with the mark provided in the liquid supply tube is provided.

6. The recording apparatus according to claim **5**,
wherein the mark which is provided in the storage unit is expressed by a concave/convex part provided on a wall surface of the storage unit.

7. The recording apparatus according to claim **1**,
wherein, at a part where the supporting portion in the recording unit is provided, a mark which becomes a pair with the mark provided in the liquid supply tube is provided.

8. The recording apparatus according to claim **7**,
wherein the mark which is provided in the recording unit is expressed by a concave/convex part provided on a wall surface of the recording unit.

9. The recording apparatus according to claim **1**,
wherein the plurality of liquid storage bodies are stored in the liquid storage unit.

10. The recording apparatus according to claim **1**,
wherein an opening is provided in the recording unit, and the liquid supply tube which is supported by the supporting portion is guided to the inside of the recording unit from the inside of the storage unit through the opening.

11. A recording apparatus, comprising:
a recording head which performs recording by ejecting liquid onto a recording medium;
a recording unit which stores the recording head;
a storage unit which stores a liquid storage body that stores the liquid to be ejected from the recording head;
a liquid supply tube which supplies the liquid that is stored in the liquid storage body stored in the storage unit to the recording head; and
a supporting portion which is provided in at least one of the recording unit and the storage unit, and supports the liquid supply tube,
wherein a mark which is a reference of a part supported by the supporting portion is provided in the liquid supply tube.

12. The recording apparatus according to claim **11**,
wherein the supporting portion includes a guide groove which stores the liquid supply tube, and

wherein, in the guide groove, an outer circumferential wall on the outside of a curved portion on a curved part is provided continuously across the entire length of the curved portion of the guide groove.

13. The recording apparatus according to claim **12**,

wherein, in the guide groove, an inner circumferential wall on the inside of the curved portion on a curved part is provided intermittently, and

wherein, at a part where the inner circumferential wall in the guide groove is cut out, a protruding portion which protrudes toward the inside of the curved portion from the outer circumferential wall, and presses the liquid supply tube stored in the guide groove is provided.

14. The recording apparatus according to claim **11**,

wherein a supporting mechanism to which the liquid storage body is attached is fixed in the storage unit,

wherein, in the supporting mechanism, a liquid supply needle which is inserted into the liquid storage body and makes the liquid storage body and the liquid supply tube communicate with each other when the liquid storage body is attached is provided,

wherein, as the supporting portion, while a first supporting portion is provided at a part where the liquid supply tube is drawn out from the supporting mechanism in the storage unit, a second supporting portion is provided at a position which is separated from the first supporting portion in the case, and

wherein one pair of side walls are respectively provided in the first supporting portion and the second supporting portion, a distance between the one pair of side walls in the first supporting portion is longer than a diameter of the liquid supply tube, and a distance between the one pair of side walls in the second supporting portion is shorter than the diameter of the liquid supply tube.

15. The recording apparatus according to claim **11**,

wherein, at a part where the supporting portion in the storage unit is provided, a mark which becomes a pair with the mark provided in the liquid supply tube is provided.

16. The recording apparatus according to claim **15**,

wherein the mark which is provided in the storage unit is expressed by a concave/convex part provided on a wall surface of the storage unit.

17. The recording apparatus according to claim **11**,

wherein, at a part where the supporting portion in the recording unit is provided, a mark which becomes a pair with the mark provided in the liquid supply tube is provided.

18. The recording apparatus according to claim **17**,

wherein the mark which is provided in the recording unit is expressed by a concave/convex part provided on a wall surface of the recording unit.

19. The recording apparatus according to claim **11**,

wherein the plurality of liquid storage bodies are stored in the liquid storage unit.

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